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50 Mach Speed Models

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JANUARY 2002

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ON THE COVER: the late Jo Kotula created this beautiful painting of a P-51D Mustang for a previous cover of Model Airplane News. If you know on which issue's cover this image first appeared, mail your answer to: Jo Kotula Cover, c/o Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Email entries will not be accepted. We will draw five names from the correct entries received before February 1, 2002, and will give those entrants free, one-year subscriptions (or subscription extensions) to Model Airplane News.



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All that's new for 2002

At this time of year, manufacturers and distributors offer a sneak peek at all the RC planes and gear they're developing for the upcoming flying season; 2002 promises to be a record year for RC. For this issue, we picked 50 of our favorite new products and feature them in a special, expanded eight-page "Air Scoop." From the first ready-to-fly micro flyer that comes in its own briefcase to an ARF .90-size Fokker triplane, the industry continues to deliver a seemingly endless supply of interesting new RC plane products.



the Old Rhinebeck Aerodrome and the RC models that gathered there. Hosted by the Mid-Hudson RC club, the 2001 event saw more than 150 registered pilots; see page 46 for Gerry's take on the biggest jamboree yet.

Proven designs that have been around for many years are increasingly showing up in almost-ready-to-fly form. Such is the case with Ace's interesting flying boat, the Seamaster. For this issue, reviewer Jim Onorato assembles and test-flies the 40-size model. See page 56 for his findings.

Looking for a winter building project? This issue also features a bonus, photo-illustrated guide to more than 350 of the most popular *Model Airplane News* plans. You'll find 70 years of models here, from rubber-

Left: this Bob Violett Models MiG-15 is one of 50 turbine-powered models featured in "Mach Speed Modeling" on page 38. Below: a classic design in almost-ready-to-fly form, the Ace Seamaster 40 is an excellent performer on and off the water; see our review on page 56.

Turbine-powered jets have certainly struck a chord with RC modelers; there is probably no better example of a model airplane that so closely replicates its full-size counterpart; jet models even sound and smell like the real things. Manufacturers have responded to consumer excitement, and now, more than 50 jet kits designed specifically for these miniature jet-turbine powerplants are available. Check out our "Mach Speed Modeling" article on page 38 to see what's out there.

Every year as the leaves start to change in New York's Hudson valley, classic RC and vintage full-size aircraft come together for a weekend to celebrate aviation's rich history. Senior tech editor Gerry Yarrish attended the 35th annual Rhinebeck RC Jamboree and captured the excitement and magic of



powered free-flight and U-control stunts to RC scale, pattern and giant-scale models. This year, we've added a new category—backyard flyers—for models that use the latest in micro RC gear and electric power and are well-suited to being flown in confined areas. For the complete selection of *Model Airplane News* plans, visit our RC Store at www.rcstore.com. ✈

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Our readers write back

BACKYARD FLYER FAN

I've been out of RC for about 10 years, but recently, while visiting the local hobby shop, I saw a park flyer, bought it, and I'm hooked. I loved the premiere issue of *Backyard Flyer*; it will be framed and hung alongside my premiere issue of *Classic Toy Trains*. Look forward to your first quarterly issue. Thanks. [email]

AL THAGARD

BACKYARD FLYER AEROBAT

I really appreciated your review of the Great Planes Laser Mini 3D kit in *Backyard Flyer*. I ordered the model online the day I read the article! I wondered whether author Vic Bunze had had the opportunity to test his model with the Astro 010 he mentioned as a possible hop-up motor. I've already started building my kit and am looking forward to doing aerobatics in my front yard. Thanks for



yet swapped the Astro 010 into the Mini 3D because before I can do so, I need to make some structural modifications, such as changing the firewall position and the opening in it. I might also need to lengthen the landing gear to accommodate a larger prop. Also, remember that the battery cells need to be mounted side by side in a single

the new magazine; you've got my subscription! [email]

JOHN SULLIVAN

row (not up) to fit in the compartment under the wing.

At the NEAT Fair earlier this month, I saw a Laser Mini 3D equipped with a Hacker B20 brushless geared motor, and it was an impressive combination. This model was equipped with longer carbon-fiber landing gear. The Laser Mini 3D is light and has enough wing area to easily support a heavier, more powerful motor. I hope this helps.

VIC BUNZE

RCV REVIEW

I read with great interest your report on the RCV 120-SP rotating cylinder-valve engine in the September 2001 issue of *Model Airplane News*. But you gave no hint of its performance compared with a conventional 120 4-stroke. In the absence of direct comparison, I felt that your article condemned the RCV with faint praise. Am I wrong?

Will the RCV 120-SP turning a 16.5x13 prop produce a flight performance that's similar to, say, a Magnum 120 turning a 15x8 prop? I noticed that the RCV produces 1.8hp at 5,800rpm. I do not know what horsepower the Magnum produces at 8,300rpm with the 15x8 prop.



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The RCV is an interesting proposition if power outputs are comparable. Please advise. [email]

ROB HULL

Rob, I was impressed with many aspects of the RCV 120 and would not condemn it in any way. The reason I did not directly compare the engine with other 4-stroke engines of similar size is that it would be a case of apples and oranges. The real test is yet to come when I get a chance to power a model or two with the RCV engine and see how they perform. It would have been unfair to both our readers and the manufacturer to simply say that the RCV 120 is the best match of "Brand X" engine. When I do the in-flight testing, I will report my findings. The RCV engine was able to turn a 17x13 APC prop at 5,550rpm, which is very close to its maximum horsepower rpm.

I can say that the engine is very easy to start and has almost instant throttle transition. It has a lot of torque and is built using very high-quality standards. GY

CUSTOM-CUT METAL

I noticed that several companies will now custom-cut wooden parts for modelers using laser technology. I have sent my CAD files out and in short order have received beautifully done wooden parts to build my models with. It is a great time we live in.

My question is: do you know of any companies that will laser-cut metal parts for modelers? I want to build a scale model, and several metal brackets need to be reproduced. Is it possible to have these parts cut out as well? The wood-cutting companies that I've dealt with say they cannot do it. Your help will be appreciated.

HAROLD YOUNG
SIDNEY, AUSTRALIA

Harold, the laser cutters that are used to cut balsa and plywood parts have a power output of between 15 and 30 watts. Much more power than that is required to cut metal, but owning such a powerful tool is not cost-effective for the average wood-cutting model company. An alternative to lasers is to use high-pressure water-spray cutting. As strange as it sounds, water cutting is just the thing for metal parts.

The technology is several years old and is used in industry to cut out many products, from disposable diapers to intricate leather pieces used in boot making. The water is first filtered and then sent to a super-high-pressure pump called an intensifier. The water is then routed to a cutting wand at more than 50,000psi pressure. In the end of the wand is an industrial diamond disc with a 0.002-diameter hole in it. The extremely fine spray of water from the wand does the cutting. Controlled by CAD/CAM computer programs, water cutters are capable of cutting very precise patterns through several layers of sheet metal.

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GETTING BETTER IDEAS OFF THE GROUND

The only water-cutting service for modelers that I am aware of is offered by Jamie Johnston of Arizona Model Aircrafters. There is a setup fee as well as a cutting charge, but once you have the first parts cut out, each cutting session thereafter is less expensive. Give Jamie a call at (480) 348-3733 or fax him at (480) 348-3773; www.arizonamodels.com. GY

CORRECTION

In the December 2001 issue, we inadvertently published the incorrect plan with Don Carkhuff's Berryloid Trophy Winner construction article. We apologize for any inconvenience this may have caused. To see Don's beautifully detailed plan, go to www.modelairplanenews.com/plan/fsp1201a.



MOBILE MINI-VISE

A mini-vise is a valuable modeling tool in any shop, but all too often it isn't in quite the right place for the job at hand. That's where a portable vise mount comes in handy. You can make one with a few pieces of $\frac{3}{4}$ -inch-thick scrap wood and two 5-inch machine screws. Cut the top and bottom pieces to suit the size vise you have, making the bottom piece slightly larger to add stability. Make spacers to set the distance between the top and bottom pieces, then drill holes for the two screws and bolt everything together. Router mat from woodworkers' supply stores makes an excellent nonslip surface for the underside of the base.

Dave Seale, Dedham, MA

A NEW TWIST ON Z-BENDS

Z-bends are an established method for securing control arms, but they leave little room for adjustment later on. Instead, bend the wire as shown here. The effect is the same as a Z-bend, but you can open the bend back out with a screwdriver to make adjustments.

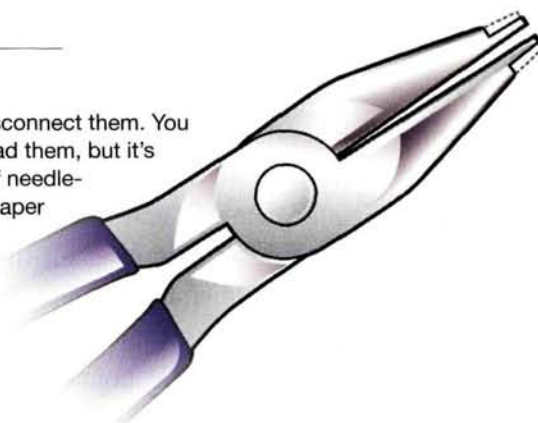
*Jack Dundas,
Ridgeville, Ontario, Canada*



CLEVER CLEVIS TOOL

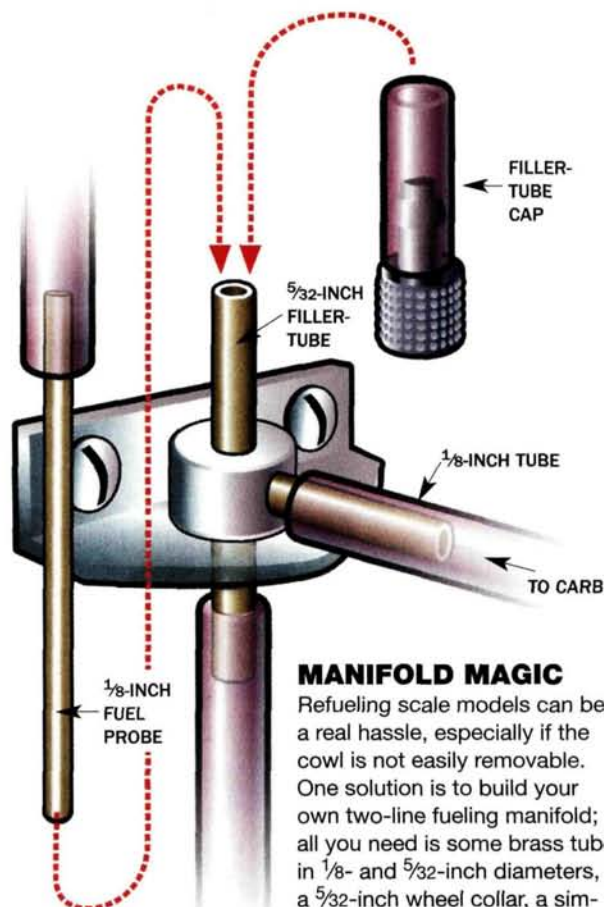
Clevises can be tough to get hold of when you need to disconnect them. You might be able to buy an appropriately shaped tool to spread them, but it's easier and less expensive to make your own from a pair of needle-nose pliers. Using a rotary tool, grind a flat notch into the taper of the pliers, just behind the tip. Try to make both sides smooth and even, and don't grind too much, or the tips will snap when you use them as pliers. Simply slip the closed plier tips into the clevis, and use the flats to spread the clevis as you open the pliers.

George Anderson, Wimauma, FL



SEND IN YOUR IDEAS.

Model Airplane News will give a free, one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Readers' Tip & Tricks." Send a rough sketch to *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



MANIFOLD MAGIC

Refueling scale models can be a real hassle, especially if the cowl is not easily removable. One solution is to build your own two-line fueling manifold; all you need is some brass tube in $\frac{1}{8}$ - and $\frac{5}{32}$ -inch diameters, a $\frac{5}{32}$ -inch wheel collar, a simple bracket, a couple of screws

and some soldering equipment. Drill an $\frac{1}{8}$ -inch hole in the side of the $\frac{5}{32}$ -inch tube, and slip the wheel collar over the tube so the setscrew hole aligns with the hole in the tube. Slide a piece of $\frac{1}{8}$ -inch brass tube into the setscrew hole so it sits up against the $\frac{5}{32}$ -inch tube, and solder all the joints. Insert this assembly into the hole in the bracket, and connect the fuel line to your tank to the bottom of the $\frac{5}{32}$ -inch tube. Connect the $\frac{1}{8}$ -inch tube outlet on the side to the line that runs to your carb. Drill an access hole in your model's fuselage, and mount the bracket so that the top of the $\frac{5}{32}$ -inch tube lines up with the fuselage hole and sits flush with it. Insert a longer piece of $\frac{1}{8}$ -inch brass tube

into the line on your fuel bottle to serve as a fuel probe; it will slide into the filler tube in the access hole. When your tank is full, plug the filler tube, and you are set to go.

*W.N. Henderson,
Trenton, Ontario,
Canada*

READERS' TIPS & TRICKS

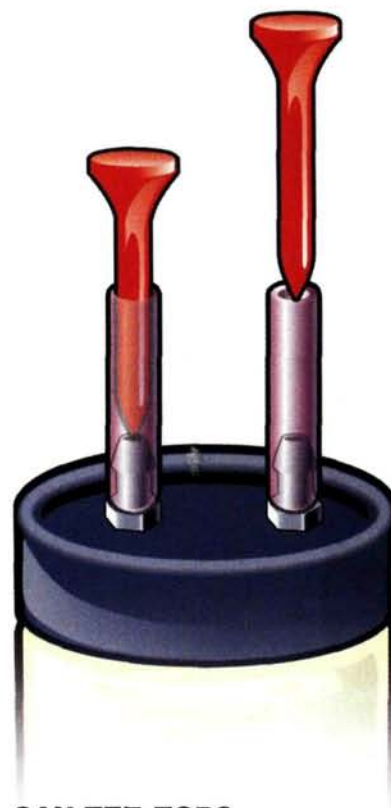
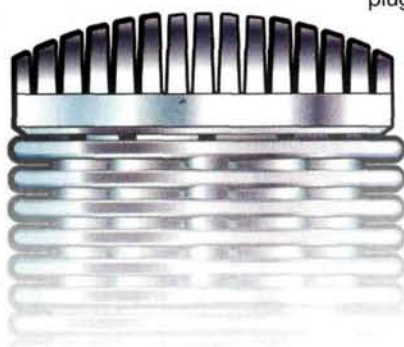


PLUG PROTECTION

It is tempting to use a plug wrench to reach down past the cooling fins to thread a new plug into the head. Wrenches are designed for leverage, and sometimes this extra torque can cause you to cross-thread a new plug, damaging the threads on the plug—or worse, the head—before you realize it isn't lined up. Instead, to extend your reach as you start threading the plug, slip a length of small-diameter fuel tubing over the

plug. If the plug is properly positioned, the tubing will provide enough grip to get it started cleanly, but if it's cross-threaded, the tubing will lose grip before the threads become damaged.

*Phil Shrive, Arnprior,
Ontario, Canada*



FUEL CAN TEE-TOPS

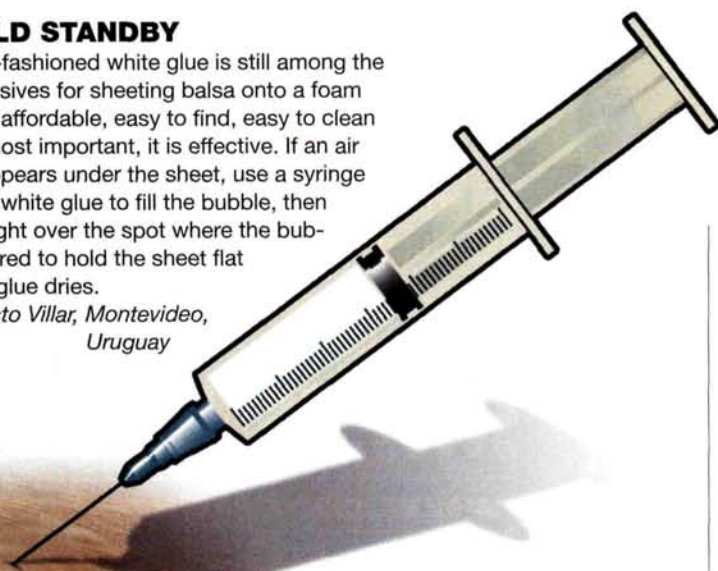
Moisture is the enemy of nitro fuel; once it's contaminated, both the performance and the reliability of your engine will suffer. Fuel cans with fuel fittings are convenient, but they are a prime source of moisture contamination. To seal up your can and preserve costly fuel, stick a couple of golf tees into lengths of fuel tubing. Make sure the seals are tight, then stick the other ends of the tubing over the fittings on top of your fuel can.

Tom Baker, Canandaigua, NY

THE OLD STANDBY

Good old-fashioned white glue is still among the best adhesives for sheeting balsa onto a foam wing. It is affordable, easy to find, easy to clean up, and most important, it is effective. If an air bubble appears under the sheet, use a syringe filled with white glue to fill the bubble, then place weight over the spot where the bubble appeared to hold the sheet flat while the glue dries.

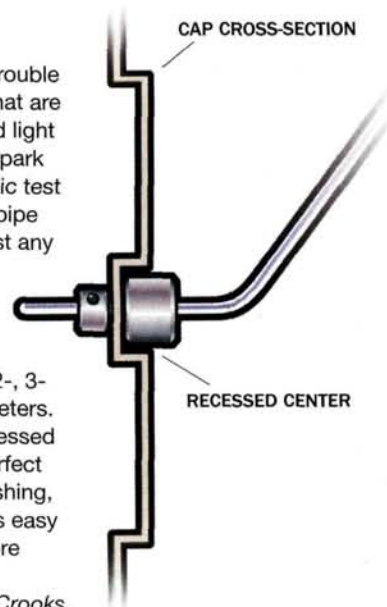
*Augusto Villar, Montevideo,
Uruguay*



LIGHT FLY WHEELS

Are you having trouble finding wheels that are the right size and light enough for your park flyer? Light plastic test caps for plastic pipe are sold in almost any hardware or home improvement store, and they can be had in 1½-, 2-, 3- and 4-inch diameters. Most have a recessed center that is perfect for holding a bushing, and the plastic is easy to paint for a more scale look.

*Gary Crooks,
Mesquite, NV*



PILOT PROJECTS

A look at what our readers are doing

COLIN ESPLEN, DARTMOUTH, NOVA SCOTIA, CANADA FORCE 1

Keith Esplen sent us this photo of his 14-year-old son, Colin, with his Balsa USA model, the "Force 1." According to Keith, the Force was Colin's first kit purchase, and we don't think he did too badly for his first time out. Colin powers his model with a Thunder Tiger GP-42 engine turning a 10x6 APC prop, and he controls it with a Hitec Flash 4 radio system. It's covered entirely with MonoKote, and Colin hand-cut each maple leaf. He also equipped his plane with a Vortac bomb-release system, which is cleverly disguised in the center of the large maple leaf on the bottom of the aircraft.



SEND IN YOUR SNAPSHOTS. *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable but please do not send digital printouts. We receive so many photographs that we are unable to return them.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.



DALE BRINDAMOUR, YAKIMA, WA FOUR STAR .40

The "Planes Worth Modeling" column in the September 2001 issue of *Model Airplane News* featured a Z-137 Agro Turbo and inspired Dale to design a "cartoon" or sport-scale version. He did so by adding a unique balsa canopy, winglets and a dorsal fin to the Sig Mfg. Four Star .40. Dale powers his one-of-a-kind creation with an O.S. .48 Surpass engine with a dummy "supercharger" that's made of balsa and painted with chrome silver Rustoleum.



ERNIE JONES, MACUNGIE, PA FOKKER DR-1

This 48-inch-span Fokker DR-1 is Ernie's pride and joy. Built by Dick Eimert of Monsey, NY, Ernie's WW I treasure is powered by an O.S. .52 4-stroke engine and controlled by a Futaba 4-channel radio system. The Red Baron is covered in 21st Century fabric and was given a Top Flite clear overspray.



BOB INGLE ROCHESTER, NY CAP 232

Bob sent us this photo of his Carden Aircraft CAP 232. Bob powers his aerobat with a Quadra 100 XL engine. An 8-channel PCM radio with nine Futaba servos guides Bob's 101-inch-span, 35-pound, giant-scale model through the sky. It's finished with Du Pont aircraft paint, and according to Bob, his 35-percent-scale CAP not only looks good, but it also flies great!



JAMES OLDHAM, CLARKSVILLE, TN BYRON PITTS SPECIAL

James sent us this photo of his 1/8-scale Byron Pitts Special. James's classic foam model is powered by a Webra .61 engine that's mounted in a Byro-Drive that delivers two and a half times as much power as a standard setup. An Airtronics 6-channel radio controls the model. James coated his model with thinned wood filler, sanded it down and then applied four coats of exterior house paint. He then finished it with six coats of Minwax Polyurethane to fuelproof the plane. James says that his model flies very smoothly, does quick turns and has seemingly unlimited vertical climbing abilities.



BILL WATKINS, LOUISVILLE, KY SPITFIRE MK 24

Bill built this Century Jet Models 88-inch-span Spitfire Mk 24. He powers his WW II classic fighter with a Moki 2.1 engine (inverted) turning a 20x10 APC prop. Bill's model weighs 31 pounds and is equipped with Futaba radio

gear. It features J'tec functional, scale exhausts, a McDaniel onboard glow driver and a full cockpit. Bill achieved that pristine finish by simulating all of the panel lines prior to painting the panels with several coats of PPG acrylic paint and covering them with a mixture of satin and high-gloss finish paint.



BRUCE HARLOW, ELLENSBURG, VA F-14

Bruce designed and built what is probably the most unique "Pilot Project" we've ever seen—and, yes, it is RC. This rocket-powered, stand-off-scale F-14 swing-wing glider can reach heights of up to 400 feet. Constructed of foam, balsa, lite-ply and carbon fiber and covered with MonoKote, Bill's rocket has a wingspan of 72 inches and weighs in at 4.5 pounds. Twenty-five-pound DJ Aerotech reloadable motors send this rocket soaring into the sky, then Futaba radio gear opens the wings and guides it safely back to earth.

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BILL PFEIFFER, CINCINNATI, OH EXTRA 330L

Believe it or not, this Great Planes Extra is Bill's first giant-scale model venture. His Extra has a 101-inch wingspan, it weighs 28 pounds and is powered by a MacMinarelli 85cc, twin-cylinder engine turning a 26x10 prop. It's equipped entirely with Hitec radio gear, including 10 servos: two for each aileron, two for the rudder, two for the elevators, one for the throttle and one for the internal kill switch. The plane is equipped with a TME smoke system, and though Bill still isn't completely at ease flying a giant-scale model, he says his Extra performs extremely well.



JEFF POGAR EAST PATCHOGUE, NY LASER 200

According to Jeff, this 1/4-scale Lanier Laser 200 took two months to build—and nearly as long to finish. Jeff painstakingly painted the cowl, canopy, turtle deck, wheel pants and landing gear with Chevron paint and then covered the rest of the model with MonoKote. He powers "Ziggy" with a SuperTigre 2300 engine with a Slimline large-volume muffler and a Zinger 18x8 prop. With the SuperTigre engine delivering 3.7hp, Jeff says his plane can perform excellent vertical maneuvers at 3/4 throttle.

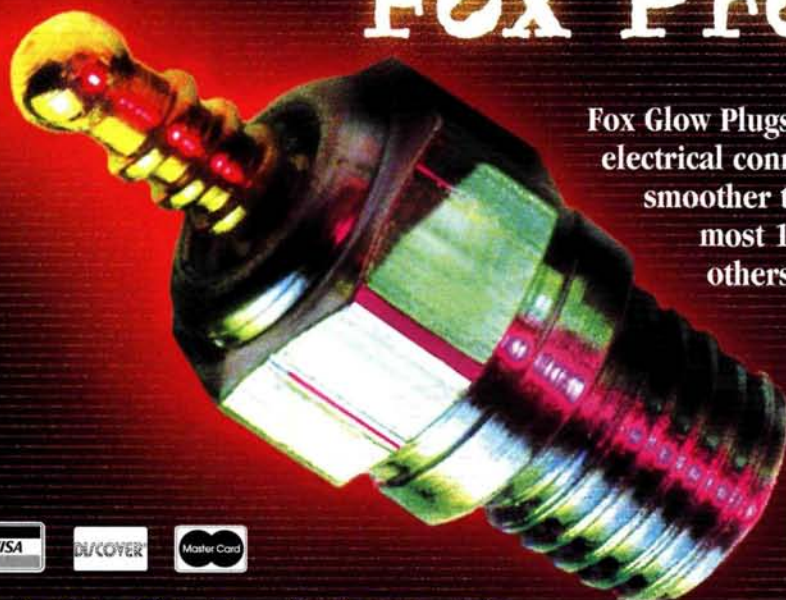
CARMEN LUCIANO, HUNTINGTON, CT F4U CORSAIR

Carmen couldn't have picked a better plane for his first attempt at building a scale warbird, and the folks at the Connecticut Model Airplane Club must have agreed when they awarded it first place in their "Winter Build" contest. The Top Flite .60 Gold Edition F4U Corsair features Robart retracts, a detailed cockpit, a dummy radial engine, 50-caliber machine guns and scale panel lines and rivets. It's powered by a SuperTigre G 75 engine with a Pitts muffler and is controlled by JR radio equipment. Carmen finished his pristine warbird entirely in MonoKote.



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New for 2002

SPECIAL EDITION AIR SCOOP

JR X-378 Radios

Advanced pilots will appreciate the in-depth features of these new 7-channel, programmable radios. With 8-model memory and a high-quality flight pack including a JR Slimline R700 FM receiver and four or five JR S537 ball-bearing servos, the X-378 comes in aircraft and helicopter configurations.

Prices—\$339.99 (aircraft); \$359.99 (heli).

JR; distributed by Horizon Hobby Inc., (217) 355-9511; www.horizonhobby.com.



This IMAA-legal, 1/4-scale aerobat can be ready for flight in 15 short hours. The all-wood, MonoKote-covered model is a licensed scale version of the red, white and blue Extra flown by Patty Wagstaff—the first American woman to become a world-champion aerobatic pilot. The plug-in wing halves and stabilizers can be removed and reattached quickly for easy assembly and easy transport. Wingspan—78 in.; area—1,157 sq. in.; weight—14 to 16 lb.; radio req'd—4- to 7-channel radio w/6 or 7 servos; engine—1.20 to 1.80 4-stroke.

Price—not available at press time.

Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.

GREAT PLANES Patty Wagstaff Extra 300S ARF



If you're looking for a light, high-quality engine, then look no further than the new AME

NORVEL Two .40-size engines

.40BBRC or Big Mig .40RC from Norvel. The Big Mig is precision engineered with six ports for a more efficient fuel draw, and the AME has a four-port venting system for maximum rpm and higher compression. All Norvel engines come with noise-reducing, power-efficient mufflers.

Prices—not available at press time.

Norvel; distributed by Sig Mfg., (641) 623-0215; www.sigmg.com.



GREAT PLANES Ryan STA EP

Return to the golden age of aviation with the Ryan STA EP. This easy-to-build, semi-scale model combines the convenience of clean, quiet electric power with the styling of a classic design. The preformed ABS cowl, wheel pants and headrest ease construction and get you in the air sooner than many other kit models. Wingspan—49 in.; area—401 sq. in.; weight—3 to 3.5 lb.; radio req'd—4-channel w/4 miniservos; motor—Speed 600.

Price—not available at press time.

Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.

ACE HOBBY

Cloud Dancer 40 and 60

The classic Cloud Dancer now comes built and covered in Ultracote in .40 and .60 sizes. With their double-tapered wings, wide-stance gear with wheel pants and optional retracts, these planes look good and are sure to fly well. Wingspan—60/72 in.; area—625/840 sq. in.; weight—4.2 to 4.5/6 to 7 lb.; radio req'd—4-channel w/4 servos.

Prices—\$159.99 (40); \$199.99 (60).

Ace Hobby Dist., (660) 584-7121; www.acehobby.com.



Most manufacturers traditionally release new products at this time of year, but 2002 is already breaking records in terms of great new RC stuff. We picked 50 of our favorites and expanded "Air Scoop" to eight pages to bring you the latest and greatest planes and gear. Remember, you saw it here first!



SPY SHOT!

E-FLITE ElectraJet

A foam flyer never looked so fierce! Easy assembly and great maneuverability make this electric pusher a hit, and it's equipped with a Maxx 25 ESC, 380 motor and gearbox and prop. Wingspan—33.25 in.; area—325 sq. in.; weight—16 to 24 oz.; radio req'd—3-channel w/2 microservos.

Price—\$149.95

E-Flite; distributed by Horizon Hobby Inc., (217) 355-9511; www.horizonhobby.com.



GWS Micro Ducted Fan

All you devoted ducted-fan fliers who are interested in micro RC but never thought it possible, take heart. The future is here. The GWS EDF50 weighs just over 1 ounce and comes with a special motor that provides 73 grams of thrust at 7.2 volts.

Price—not available at press time.

GWS; distributed by Horizon Hobby Inc., (217) 355-9511; www.horizonhobby.com.



SUPER KRAFT Laser 2000

IT'S A BEAUTY!

This aerobatic ARF model features all-wood construction, Oracover covering and a fiberglass cowl and wheel pants. Super Kraft notes that pilots have already flown this model to the winners' circle in many contests overseas, so it definitely flies as great as it looks! Wingspan—87 in.; area—1,275 sq. in.; weight—16 to 18 lb.; radio—4-channel w/6 servos; engine—320 to 340cc.

Price—\$497.77

Super Kraft, (877) 203-2377; www.kangkeusa.com.



This good-looking aerobat comes out of the box already built and covered with Ultracote and with a painted epoxy/glass cowl; add a .60 2-stroke, and you'll be at the field in just a few hours. Wingspan—65 in.; area—78 sq. in.; weight—8.5 to 9.5 lb.; radio req'd—4-channel w/5 servos.

ACE Staudacher 60

Price—\$239.99

Ace Hobby Dist., (660) 584-7121; www.acehobby.com.



MODEL TECH P-51D 40 ARF

The folks at Model Tech paid careful attention to scale detail when they produced this beauty. You'll be impressed by its many special features, including its all-wood construction, fully sheeted wing, retractable landing gear, fiberglass painted cowl and custom-made aluminum spinner. Just add radio gear and an engine, and this P-51D will be up in the air and impressing your flying buddies in no time. Wingspan—57 in.; area—612 in.; weight—3.9 lb.; radio req'd—5-channel w/4 standard servos and 1 retract servo.

Price—\$199.99

Model Tech; distributed by Global Hobby Distributors, (714) 964-0827; www.globalhobby.com.

New for 2002

SIG MFG. Rascal 40 ARF

The classic appeal of the Sig Rascal has caught the eye of many RC enthusiasts over the years. Now, by popular demand, it's available in a larger package. Like its smaller counterparts, the Rascal 40 comes 90-percent assembled with a complete hardware package. It is available in two color schemes: transparent blue and white and transparent red and white. Wingspan—72.5 in.; area—728 sq. in.; weight—5 to 5.5 lb.; radio req'd—4-channel w/5 servos.

Price—\$309.99

Sig Mfg., (641) 623-0215;
www.sigmf.com.



SIG MFG. 1/5-scale J-3 Piper Cub

The new 1/5-scale Cub from Sig Mfg. includes so many scale details that you may have a tough time distinguishing it from its full-scale counterpart. It features 90-percent laser-cut balsa and ply parts, a molded-plastic windshield, windows and engine cylinders, a durable tailwheel assembly, a full-size plan and a complete hardware package. Wingspan—84.5 in.; area—947 sq. in.; weight—7 lb.; radio req'd—4-channel w/5 servos; engine—.40 to .46 2-stroke.

Price—\$199.99

Sig Mfg., (641) 623-0215; www.sigmf.com.



FUTABA 9C radio systems

SPY SHOT!

If you're looking for an easy-to-use yet sophisticated radio system, check out Futaba's new 9C series. These programmable radios come in several packages with various receivers and servos. The 9C systems also include many special features that can be individually applied specifically to airplanes, helicopters and sailplanes. Each radio is covered by a Futaba 2-year warranty.

Prices—range from \$599.99 to \$849.99.

Futaba; distributed exclusively by Great Planes Model Distributors, (800) 682-8948;
www.greatplanes.com.



Midwest's popular Aerostar trainer design is now available ready to fly, with all-wood construction, Ultracote covering and all hardware and gear included. Add an engine and radio gear, and you'll be ready to conquer the sky!

Wingspan—62 in.; area—675 sq. in.; weight—5.5 lb.; engine—.40 2-stroke; radio req'd—4-channel w/4 servos.

Price—not available at press time.

Falcon Trading, (800) 591-2896, www.falcon-trading.com.

FALCON TRADING Aerostar ARF



HANGAR 9 Two new CAP 232s

These new almost-ready-to-fly aerobats feature light yet strong construction and excellent flight characteristics. The 1/5-scale CAP has a patriotic red, white and blue scheme, and the 80-inch model is pearl purple, white, red and black. Specifications: 1/5-scale model, wingspan—97 in.; area—1,750 sq. in.; weight—22 to 25 lb.; engine—Zenoah GT-80 or equivalent; 80-inch-span model, area—1,248 sq. in.; weight—14 to 16 lb.; engine—1.8 to 2.1 2-stroke, Saito 300 twin 4-stroke, or G38 to G45 gas.

Prices—\$799.99 (1/5-scale); \$499.99 (80-inch-span).

Hangar 9; distributed by Horizon Hobby Inc., (217) 355-9511; www.horizonhobby.com.



SIG MFG. Pioneers of Flight

SIG GOES INDOORS!

To celebrate the 100th anniversary of manned flight, Sig Mfg. proudly introduces this series of 3-channel indoor flyers: the 1909 Demoiselle, the 1909 Antoinette and the 1910 Duperdussin. All feature laser-cut parts, Lite-Span covering, simulated rigging, wheels and hardware.

Prices—not available at press time.

Sig Mfg., (641) 623-0215; www.sigmf.com.



GREAT PLANES PT-19 giant-scale ARF

This .60- to .91-size all-wood replica of the classic U.S. Army trainer can be ready to hit the flightline in as little as 20 hours. Covered entirely in Top Flite MonoKote, the PT-19's lightweight and sturdy construction allow it to perform well with economical, lower displacement engines. Wingspan—82.5 in.; area—1,027 sq. in.; weight—9.7 to 10 lb.; radio req'd—4-channel w/5 servos.

Price—\$399.99

Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.

GREAT PLANES SlowPoke Sport .40 ARF

Combine the classic looks of 1930s' flyers with the building conveniences of today, and you get the SlowPoke Sport .40 ARF. Its impressive wing area produces smooth, stable flight, which makes it a great first plane for low-wing beginners. Drop in a .40-size engine, and you could be in the air in a little more than 10 hours. Wingspan—61.5 in.; area—1,076 sq. in.; weight 6 to 6.5 lb.; radio req'd—4-channel w/5 servos.

Price—\$219.99

Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.



PRINCE AMERICA Gemini 40

Available with either a trainer or sport wing, this aerobatic performer features a fiberglass fuselage, sheeted foam-core wings, prehinged control surfaces and a factory-installed engine mount and fuel tank. Wingspan—58.5 in.; weight—5.5 lb.; radio req'd—4-channel; engine—.40 2-stroke.

Price—\$209.95 plus S&H

Prince America Corp., (800) 305-4923; www.princeamerica.com.

HITEC RCD CG-340 fast field charger

This new unit will charge most 4- to 16-cell Ni-Cd and NiMH packs from a 12V DC power source. It features an adjustable charge rate of from 0.2 to 3 amps for most Ni-Cd packs and 0.2 to 1.5 amps for most NiMH packs.

Price—\$57.99

Hitec RCD Inc., (858) 748-8440; www.hitecrd.com.



New for 2002



TECH BREAKTHROUGH

in 3- and 4-channel configurations. This 19-inch-span, 51g twin indoor flyer from Megatech comes ready to fly, in a hard carrying case, with a transmitter and two battery packs that can be charged using the transmitter and its charger.

Prices—\$99.95 (P-51); \$89.99 (Dragonfly Twin).

Megatech, (201) 662-2800; www.megatechrc.com.

MEGATECH P-51 and Dragonfly Twin

Megatech's 30-inch-span P-51 model is powered by an included Speed 400 motor and features a plastic fuselage with foam flying surfaces. It weighs 16 ounces ready to fly and can be built



HOBBY LOBBY Donald 4 and Aventura II

True seaplane enthusiasts will welcome these classically designed electric amphibians. Each has a fiberglass fuselage, built-up and covered wings, a steerable water rudder for precision taxiing and takeoffs and includes a motor. Wingspans—55/43 in.; area—428/333 sq. in.; weight—3.31 lb./28 oz.; radio req'd—3-channel.

Prices—\$169 (Donald 4); \$128 (Aventura II).

Hobby Lobby Intl., (615) 373-1444; www.hobby-lobby.com.

GREAT PLANES Fokker DR.1 60 ARF

You can be in the air in less than 15 hours with the new Fokker DR.1, .60-size ARF from Great Planes. Covered in Top Flite MonoKote, this all-wood, giant model combines great attention to detail with assembly ease. Wingspan—60 in.; area—1,312 sq. in.; weight—9.1 lb.; radio req'd—4- or 5-channel w/5 standard servos.

Price—\$399.99

Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.



FUTABA 3FR FM Radio

Futaba's new 3FR FM radio comes with an R114F receiver and two S3106 microsensors—all in one complete package! The radio system also comes with Ni-Cd batteries for the transmitter and the receiver, a dual-output 60mA charger and a 1-year warranty. The single-conversion receiver is designed specifically for weight-sensitive park flyers.

Price—\$169.99

Futaba; distributed exclusively by Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.



VMAR De Havilland Beaver ARFs

Available in .45 to .60 and .60 to .90 sizes, these new De Havillands from VMAR are of all-wood construction with film covering, and each comes with a tank, metal engine mount, wheels, spinner, servo tray, hardware, installed pushrods and control surfaces. The larger model has ailerons and flaps and also comes with a cloth-dressed, full-size pilot; the smaller model comes flaperon-ready and with a dressed pilot bust. Wingspans—72/84 in.; areas—774/1,008 sq. in.; weights—6 to 6.5/10 to 12 lb.; radio—4- to 5-channel.

Prices—\$179.99 (.45 to .60 size); \$299.98 (.60 to .90 size).

VMAR; distributed by Richmond RC, (877) 727-2329; www.richmondrc.com.



WATTAGE CAP 232 EP

Based on the same class and dimensions of the WattAge Extra 330L, the new electric-powered CAP 232 features the same great scale details and exciting aerobatic capabilities. It comes with nearly everything you need including the hardware, prop and spinner, and the WattAge 480 motor with 1.7:1 gearbox is already installed. Wingspan—36 in.; area—220 sq. in.; weight—24 oz.; radio req'd—4-channel w/4 microsensors.

Price—\$129.99

WattAge; distributed by Global Hobby Distributors, (714) 964-0827; www.globalhobby.com.





GREAT PLANES

1/3-scale Pitts Special ARF

The Pitts Special won more aerobatic contests than any other aircraft, and this new 1/3-scale Pitts ARF from Great Planes is sure to win you over, too. The light, all-wood frame comes covered in MonoKote with a matching fiberglass cowl and wheel pants. Wingspan—68.5 in. (top), 64.3 in. (bottom); area—1,303 sq. in.; weight—14 to 16 lb.; radio req'd—4-channel w/8 servos; engine—1.6 to 2.7ci glow or 2.5ci gas.

Price—\$549.99

Great Planes Model Distributors, (800) 682-8948;
www.greatplanes.com.

INSTANT AIRSHOW!



LITE MACHINES

120 Corona Electric and 117 Gas Helicopters

Great for helicopter novices, the Corona electric helicopter features simple, durable construction, and it can fly for 5 to 7 minutes using 6- and 7-cell batteries. A new, improved gas helicopter from Lite Machines is powered by the new Norvel .074 Vmax-7 engine. Its simplified fuselage structure is designed to be used with a piezo gyro.

Prices—\$199 each (w/out drive system).

Lite Machines, (765) 463-0959; www.litemachines.com



ROBART MFG.

Giant-scale Cub Gear

With chromoly-welded tube frames and hardened and plated hardware, this gear is sure to stand up to the roughest landings! Scale and functional, Robart's gear even has rubber bungee cords that provide flex under pressure.

Prices—\$124.95 (1/2 scale); \$159.95 (1/3 scale).

Robart, (630) 584-7616; www.robart.com.



DUMAS PRODUCTS INC. Pietenpol and Wright Flyer

ing and 3-channel control. The prototype has a 36-inch wingspan with 398 square inches of area, but chances are that the production version will have an increased span to better accommodate Dumas' motor and prop selection.

Prices—not available at press time.

Dumas Products Inc., (520) 623-1329; www.dumasproducts.com.

The folks at Dumas unveiled two great new electric RC kits. Their Pietenpol Air Camper is a laser-cut model designed for throttle, elevator and rudder control and comes with polyester silk covering (wingspan—36 in.; area—230 sq. in.; weight—6 to 7 oz.; motor—to be determined).

The Wright Standard Type A model is a twin that also features laser-cut parts, polyester silk covering and 3-channel control. The prototype has a 36-inch wingspan with 398 square inches of area, but chances are that the production version will have an increased span to better accommodate Dumas' motor and prop selection.

New for 2002



HB JETS F-4 & F-16

HB Jets provides all of you ducted-fan lovers with two more reasons to

celebrate the new year by introducing two new jets. The F-4 Phantom is powered by two .18-size ducted-fan engines, and the F-16 Fighting Falcon runs on a single .18-size. F-4 Phantom: wingspan—44 in.; area—589 sq. in.; weight—6 lb.; radio req'd—4-channel w/5 servos. F-16 Fighting Falcon: wingspan—37 in.; area—334.8 sq. in.; weight—3.5 lb.; radio req'd—4-channel w/5 mini servos.

Prices—not available at press time.

HB Jets, (562) 468-1121; www.hotbodiesonline.com.



GLOBAL HOBBY WattAge Eindexer 400

If you appreciate the classic appeal of WW I warbirds, check out the new WattAge Fokker Eindexer 400 EP ARF from Global Hobby. This electric ARF comes almost ready to fly and features all-wood, hand-crafted construction and a painted pilot. The included 380 motor with gear drive requires an 8-cell, 600mAh battery. Wingspan—42.25 in.; area—340 sq. in.; radio req'd—3-channel with 3 microsensors.

Price—\$130

Global Hobby Distributors, (714) 963-0133; www.globalhobby.com.

WOLF ENGINES Predator 3.2 & 1.8

NEW MANUFACTURER!

Wolf's 3.2ci gas engine (shown) powers from 15- to 22-pound models, producing 7,400rpm in flight with a Scimitar 22x10 prop. It weighs 4 pounds with the included Bisson muffler and C&H ignition. Wolf's 1.8ci gas engine produces 14 to 17 pounds of thrust with an 18x8 Scimitar



prop and weighs 3 pounds, 4 ounces with the included C&H ignition and Bisson muffler.

Prices—\$529.95 (1.8ci); \$649.95 (3.2ci).

Wolf Engines,
(920) 893-9675;
www.ajengineering.com.

NORTHEAST SAILPLANE PRODUCTS Air Camper and Cadet Acro

Two new electric ready-to-fly models from Northeast are sure to please. The Air Camper is a semi-scale model of an experimental aircraft and features barn-door ailerons and parasol wing. Wingspan—52 in.; area—525 sq. in.; weight—23 to 25 oz.; power—Speed 400 geared 4:1 (supplied with APC prop). The Cadet Acro is a redesign of the popular Cadet with a longer wing, new power system and large ailerons. Wingspan—45 in.; area—357 sq. in.; weight—15 to 16 oz.; power—Speed 400 (supplied with APC prop).

Prices—\$159.95 (Air Camper); \$129.95 (Cadet Acro).

Northeast Sailplane Products, (802) 655-7700; www.nesail.com



WATTAGE Crazy Max

Wingspan—35 in.; area—284 sq. in.; weight—12 to 13 oz.; radio req'd—4-channel w/4 servos.
Price—\$69.95

WattAge; distributed by Global Hobby Distributors, (714) 964-0827; www.globalhobby.com.

If you like the original Mini-Max, you'll love the new Crazy Max 3D, which features a symmetrical airfoil, a thicker chord and ailerons. It also has a larger wing area than the original, so WattAge recommends that you use an 8-cell, 800mAh NiMH battery for a little extra thrust.

New for 2002



BACKYARD-FLYER HARDWARE!



DU-BRO Micro Hardware & Lite wheels

Du-Bro now offers lightweight, easy-to-use control hardware for indoor and backyard flyers, from control horns to E/Z links to pull/pull systems! Other new offerings for small models include plastic Micro Lite wheels.

Prices—\$1 (Micro control horns); \$1.25 for four (Micro E/Z link); \$4.95 (Micro pushrod system); \$7.95 (Micro pull/pull system), \$2.75 to \$3.25 a pair (Micro Lite wheels).

Du-Bro Products, (800) 848-9411; www.dubro.com.



SKY HOOKS & RIGGING ffx Park Fighters

This Me-109 and Mustang are two of four new Speed 400 warbird kits available from Sky Hooks & Rigging; a Japanese Zero and P-40 Warhawk round out the series. Each features balsa and foam construction and light fiberglass cloth covering and comes with all hardware. Wingspan—31 in.; weight—16 oz.

Price—\$65 each

Sky Hooks & Rigging, (905) 257-2101; www.microrc.com.



WATTAGE Sukhoi Su-31 ARF

This sport-scale electric ARF comes with nearly everything you need to get it in the air, including a 370 motor with gear drive and prop and all of the necessary hardware. Constructed entirely of foam, the Su-31 is an aerobatic and durable park flyer that you can have circling in your backyard in no time flat. Wingspan—28.1 in.; area—140 sq. in.; weight—11.5 to 12.5 oz.; radio req'd—4-channel w/microservos.

Price—\$69.99

WattAge; distributed by Global Hobby Distributors, (714) 964-0827; www.globalhobby.com.



LANIER R/C Sukhoi Su-31

This aerobat is a true giant! The laser-cut wood kit features fully symmetrical, foam-core and sheeted wings strengthened with spruce spars, and it comes with a fiberglass cowl and a clear canopy. The wings and horizontal stabilizer are removable for transport. Wingspan—120 in.; area—2,487 sq. in.; weight—38 to 40 lb.; engine—120 to 150cc; radio req'd—4-channel.

Price—\$799

Lanier R/C, (770) 532-6401; www.lanierrc.com.

THE WORLD MODELS INC. Giant-scale Zero ARF

With features like a built-up wing, fiberglass fuselage and factory-installed retractable landing gear, this new giant-scale Zero should rule the skies. Added details include a painted pilot and cowl, a transparent dummy cowl, hardware and decals. Wingspan—80 in.; area—1,156 sq. in.; weight—15 lb.; radio—6-channel w/8 servos; engine—1.60 2-stroke.

Price—not available at press time.

The World Models Inc., (925) 371-0922; www.theworldmodels.com.



WILDCAT FUELS Thermoshield

Prevent your airplane fuel from degrading because of heat and light exposure by placing it in Wildcat's new Thermoshield. The material's outer skin reflects up to 99 percent of UV and IR rays, and removable gel freezer packs keep your fuel temperature below the point at which it could vaporize.

Price—not available at press time.

Wildcat Fuels, (859) 885-5619; www.wildcatfuel.com.



Mach Speed



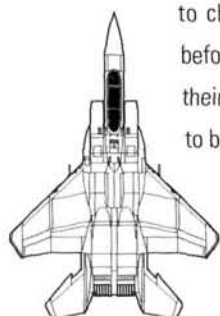
BVM Bandit

*by the Model
Airplane News
crew*



Crow Aviation Inc. Raptor

Turbine-powered jets; they don't look—or sound—like any other type of aircraft, and they definitely don't fly like any other. To many, these jets represent the pinnacle of the RC model world—the state-of-the-art in style, sophistication and performance. With this status comes a certain mystique; most modelers see the planes as out of their reach and the pilots who fly them as the unparalleled masters of the hobby. In the past, this may have been justified, but today there are more jet models and turbines to choose from and they are easier to use than ever before. People who always thought turbines were beyond their capabilities and their budget now have the opportunity to build, fly and enjoy them.



To show you what's out there, we've collected more than 50 models suitable for turbine power. Some are designed specifically for turbines; others are designed for ducted-fan power but have factory kits available to



Jet Hangar Hobbies F-86

refit them for turbines. We've also put together some basic information or the workings of turbines and the models that use them, along with some tips on how to break into this segment of the hobby. Turbine-powered jet are definitely still technically demanding, but don't be intimidated and mis out on the fun. Read on to find out why the pinnacle of the hobby is now more accessible than ever.

Modeling

50 turbine-powered jets



Air Magic Jets F-15

AIR MAGIC JETS F-15

Turbine size: single or double

Wingspan: 58 in.

Fuselage length: 83 in.

Min. flying weight: 13 lb.

Price: \$2,500

Features: single or double turbine; all epoxy/glass airframe; scale details molded in; all hardware included.

AMERICAN MODELING CO. AIRBUS INDUSTRIES A310

Turbine size: 8 to 13 lb.

Wingspan: 84 in.

Fuselage length: 87.5 in.

Min. flying weight: 28 lb.

Price: \$700

Features: gelcoated epoxy/glass fuselage, nacelles, pylons and wing center section with molded-in panel lines; sheeted-foam outer panels and tail surfaces with carbon plug-in tubes; complete wood pack; construction drawings.

DASSAULT FALCON 10

Turbine size: twin 12 to 20 lb.

Wingspan: 86 in.

Fuselage length: 84 in.

Min. flying weight: 23 lb.

Price: \$1,050

Features: prototype; no info available.

GRUMMAN X-29

Turbine size: small turbines

Wingspan: 40 in.

Fuselage length: 72 in.

Min. flying weight: 12.5 lb.

Price: \$425

Features: gelcoated epoxy/glass fuselage, full internal ducting and hatches; pre-cut wood formers; sheeted foam-core wings; construction drawings.

LOCKHEED MARTIN F-22

Turbine size: 8 to 13 lb.

Wingspan: 43 in.

Fuselage length: 63 in.

Min. flying weight: 10 lb.

Price: \$450

Features: gelcoated epoxy/glass fuselage, full internal ducting and hatches; pre-cut wood formers; sheeted foam-core wings and tail surfaces.

NORTH AMERICAN A-5 VIGILANTE

Turbine size: 12 to 20 lb.

Wingspan: 6 in.

Fuselage length: 91 in.

Min. flying weight: 13 lb.

Price: \$700

Features: gelcoated epoxy/glass fuselage, full internal ducting and hatches; pre-cut wood formers; sheeted foam-core wings, stabs and dorsal fin; construction drawings.

BOB VIOLETT MODELS BALSA BANDIT

Turbine size: RAM 750

Wingspan: 68 in.

Fuselage length: 75 in.



BVM Bandit

Min. flying weight: 16.5 lb.

Price: \$1,395

Features: Kevlar and carbon-fiber-reinforced epoxy/glass fuselage and ducting; laser and CNC-cut parts; hardware included; removable composite wing panels, stabilizer and vertical fin.

BOBCAT

Turbine size: 11 to 12 lb.

Wingspan: 66 in.

Fuselage length: 74 in.

Min. flying weight: 18 lb.

Price: \$995

Features: balsa, plywood and epoxy/glass construction; fiberglass tail booms; removable outer wing panels.



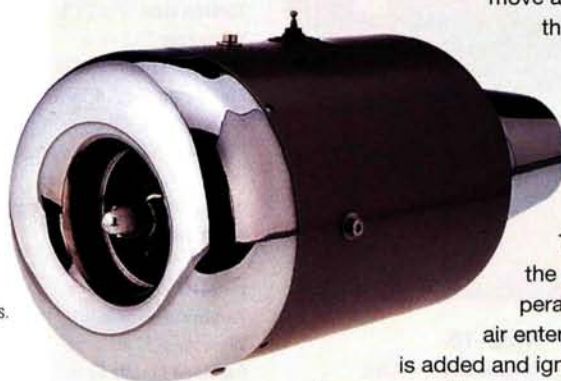
Dan Avila and copilot work on a Bob Violett Models F-86 Sabre at a Florida Jets rally.

Turbine Theory 101

All of our model motors (prop-driven, ducted-fan, etc.) work in the same manner; they speed up a volume of air backward. It's this backward acceleration that results in the opposite action for forward propulsion. There are four types of turbine engines: turbofan, turbojet, turboshaft and turboprop. Our model turbines most resemble turbojets in operation, so we'll stick to their operation for this discussion.

So how does a jet engine generate thrust? Here's a technical definition:

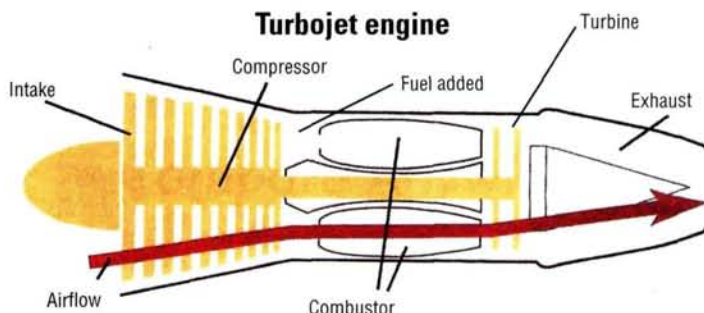
move a small quantity of air through the engine and accelerate it to a very high speed. OK, what does that mean? Simply put, air comes in the inlet of the engine and enters the compressor. The compressor increases the pressure, density and temperature of the air and then the air enters the combustor where fuel



is added and ignited. The compressed air burns more efficiently than non-compressed air would. A lot of energy has now been created by the combustion of the air. After combustion, the hot, high-velocity air flows into the turbine, which operates much like a windmill. The fast-moving air causes the blades of the turbine to spin, generating energy that is used to power other parts of the engine such as the compressor.

On model turbines, the turbine uses only a small part of the energy; the remainder of the air leaves the engine through the exhaust nozzle and is used for thrust. The whole process is self-sustaining; ignition is provided when the process is repeated.

Turbojet engine



In a turbojet engine, air enters the front of the engine, passes through the compressor and into the combustor, where fuel is added. The air/fuel mixture is ignited, then spins the turbine and exits the exhaust nozzle as thrust.



BVM MiG-15

BOB VIOLETT MODELS BOBCAT XL

Turbine size: 15 to 17 lb.
Wingspan: 66 in.
Fuselage length: 79 in.
Min. flying weight: 19 lb.
Price: \$1,075
Features: balsa, plywood and epoxy/glass construction; fiber-glass tail booms; removable outer wing panels.

F-80

Turbine size: RAM 500
Wingspan: 72 in.
Fuselage length: 64 in.
Min. flying weight: 18 lb.
Price: \$1,800
Features: all composite fuselage; scale details molded in; factory-built wing and stabilizer; scale retracts available.

CENTURY JET MODELS INC. A-4 SKYHAWK

Turbine size: 17 to 28 lb.
Wingspan: 55 in.
Fuselage length: 85 in.
Min. flying weight: 26 lb.
Price: \$1,895
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

A-7 CORSAIR II

Turbine size: 17 to 28 lb.
Wingspan: 66.5 in.
Fuselage length: 79.5 in.
Min. flying weight: 26 lb.
Price: \$1,895
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

F-100

Turbine size: 12 lb.
Wingspan: 57 in.
Fuselage length: 67 in.
Min. flying weight: 10 lb.
Price: \$495
Features: primed epoxy/glass fuselage; laser-cut plywood bulkheads; foam wings; optional accessory packages.

F-104 STARFIGHTER

Turbine size: 17 lb.
Wingspan: 44 in.
Fuselage length: 76 in.
Min. flying weight: 14 lb.
Price: \$550
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted wings; optional accessories.

F-105 THUNDERCHIEF

Turbine size: 12 lb.
Wingspan: 44 in.
Fuselage length: 82 in.
Min. flying weight: 16 lb.
Price: \$550
Features: primed, 2-piece epoxy/glass fuselage; molded-in panel lines; sheeted wing panels; laser-cut plywood parts.

HE-162 SALAMANDER

Turbine size: 17 to 21 lb.
Wingspan: 57 in.
Fuselage length: 82 in.
Min. flying weight: 14 lb.
Price: \$550
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

MiG-15

Turbine size: 17 to 21 lb.
Wingspan: 74.5 in.
Fuselage length: 74 in.
Min. flying weight: 16 lb.
Price: \$650
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

TALON TRAINER

Turbine size: 15 to 21 lb.
Wingspan: 67 in.
Fuselage length: 72 in.
Min. flying weight: 18 lb.
Price: \$1,295
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

F-100D

Turbine size: 27 to 29 lb.
Wingspan: 69 in.
Fuselage length: 83.5 in.
Min. flying weight: 29 lb.
Price: \$4,195
Features: all composite airframe; can be completely disassembled for transportation; many scale details and scale retracts available.

F-16 FIGHTING FALCON

Turbine size: RAM 500
Wingspan: 46 in.
Fuselage length: 70 in.
Min. flying weight: 12 lb.
Price: \$1,195
Features: prototype

F-4 PHANTOM II

Turbine size: RAM 1000
Wingspan: 57 in.
Fuselage length: 80 in.
Min. flying weight: 24 lb.
Price: \$3,695
Features: all composite airframe; molded-in panel lines; CNC-machined and laser-cut internal parts; single turbine; many scale accessories available.

MiG-15

Turbine size: RAM 750
Wingspan: 68 in.
Fuselage length: 68 in.
Min. flying weight: 20 lb.
Price: \$7,650
Features: all composite airframe; molded-in panel lines; removable wing panels, stabilizers and fin; scale retracts available.

RAFALE B 01

Turbine size: twin RAM 1000s
Wingspan: 64 in.
Fuselage length: 86 in.
Min. flying weight: 35 lb.
Price: \$4,750
Features: all composite airframe; removable wing, canards and fin; single or twin turbine; pre-installed carbon-fiber and plywood formers.

T-33

Turbine size: 19 to 20 lb.
Wingspan: 79 in.
Fuselage length: 69 in.
Min. flying weight: 16 lb.
Price: \$1,950
Features: all composite fuselage; scale details molded in; factory-built wing and stabilizer; scale retracts available.

F-15E

Turbine size: 17 to 28 lb.
Wingspan: 63 in.
Fuselage length: 90 in.
Min. flying weight: 26 lb.
Price: \$1,895
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

F-22

Turbine size: 21 to 28 lb.
Wingspan: 64 in.
Fuselage length: 83.5 in.
Min. flying weight: 22 lb.
Price: \$1,995
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

F-4 PHANTOM "MK II"

Turbine size: twin 17 lb. or single 28 lb.
Wingspan: 60 in.
Fuselage length: 94 in.
Min. flying weight: 25 lb.
Price: \$1,100
Features: primed, 2-piece epoxy/glass fuselage; sheeted form-core wings; laser-cut plywood parts; many optional accessories.



Century Jet Models F9F-8

F9F-8 COUGAR

Turbine size: 17 to 28 lb.
Wingspan: 74.5 in.
Fuselage length: 87 in.
Min. flying weight: 18 lb.
Price: \$1,595
Features: primed epoxy/glass fuselage; laser-cut plywood parts; sheeted foam-core wings; optional accessories.

CROW AVIATION INC. F-100

Turbine size: 35 to 42 lb.
Wingspan: 76 in.
Fuselage length: 96 in.
Min. flying weight: 42 lb.
Price: \$7,000
Features: fully molded airframe with panel lines and surface details; detailed instruction manual; custom retractable landing gear.

Note: some turbine sizes may require speed limiters.



F-16

Turbine size: 13 to 18 lb.
Wingspan: 50 in.
Fuselage length: 74.5 in.
Min. flying weight: 18 lb.
Price: not yet determined
Features: molded fuselage, wings and control surfaces; plug-in wings and stabilizers.

PANTHER

Turbine size: 28 to 30 lb.
Wingspan: 85.5 in.
Fuselage length: 84.9 in.
Min. flying weight: 36 lb.
Price: \$7,000
Features: fully molded airframe; detailed instruction manual with CAD and photo illustrations; custom retractable landing gear.

PREDATOR

Turbine size: 28 to 30 lb.
Wingspan: 86 in.
Fuselage length: 96 in.
Min. flying weight: 34 lb.
Price: \$6,000
Features: ARF; fully molded composite airframe; custom retractable landing gear.

RAZOR

Turbine size: 12 to 20 lb.
Wingspan: 66 in.
Fuselage length: 72 in.
Min. flying weight: 19 lb.
Price: \$4,100
Features: ARF; fully molded composite airframe; custom retractable landing gear.

DL AEROMODELES INC. AERMACCHI MB339

Turbine size: 12 to 18 lb.
Wingspan: 67 in. (incl. tanks)
Fuselage length: 64 in.
Min. flying weight: 14 lb.
Price: \$948
Features: turbine upgrade package available; epoxy/glass construction; sheeted flying surfaces; machine-cut plywood, balsa and hardware; comes with full-size wing, stab and fin plans; convertible from turbine to DF and back.

CYCLONE III

Turbine size: RAM 500
Wingspan: 50 in.

FIBERCLASSICS EUROFIGHTER

Turbine size: 22 to 35 lb.
Wingspan: 66 in.
Fuselage length: 94 in.
Min. flying weight: 25 lb.
Price: \$3,600
Features: fiberglass fuselage and wings; plug-in wings; complete hardware; detailed construction manual.

F-86 SABRE

Turbine size: 11 to 28 lb.
Wingspan: 75.6 in.
Fuselage length: 72 in.
Min. flying weight: 19 lb.
Price: \$2,479
Features: carbon/Kevlar-reinforced fiberglass components with realistic surface; plug-in stabilizer and wings; includes hardware.



Fiber Classics Kangaroo

KANGAROO

Turbine size: 11 to 28 lb.
Wingspan: 72 in.
Fuselage length: 70 in.
Min. flying weight: 12 lb.
Price: \$800

engine nacelles; surface details (more than 22,000 rivets); 2-piece, balsa-sheathed foam wings with finished flaps and ailerons; retracts with wheels and brakes; all hardware included; cockpit available.

JET HANGAR HOBBIES A-4 SKYHAWK

Turbine size: 8 to 12 lb.
Wingspan: 47 in.
Fuselage length: 57 in.
Min. flying weight: 14 lb.
Price: \$425
Features: epoxy/glass fuselage; foam wing panels; precision-cut balsa and plywood parts; adhesive-backed Mylar rib and former templates; full-size plans and photo instruction booklet.

A-7 D/E CORSAIR II

Turbine size: 8 to 12 lb.
Wingspan: 47 in.
Fuselage length: 57 in.
Min. flying weight: 14 lb.
Price: \$425
Features: epoxy/glass fuselage; foam wing panels; precision-cut plywood and balsa parts; convertible to

fuselage; precision-cut balsa and plywood parts; removable wings; includes all pre-cut wood, foam and fiberglass parts; full-size plans and photo instruction booklet.

F-4 PHANTOM II

Turbine size: 12 to 17 lb.
Wingspan: 44 in.
Fuselage length: 68 in.
Wingspan: 47 in.
Min. flying weight: 16 lb.
Price: \$525
Features: epoxy/glass fuselage and belly pan; foam inner wing panels; precision-cut plywood and balsa parts; includes landing-gear wire and pivot mechanism for full flying stab; full-size plans and photo instruction booklet.

F-86 SABRE

Turbine size: 8 to 12 lb.
Wingspan: 50.5 in.
Fuselage length: 50.5 in.
Min. flying weight: 14 lb.
Price: \$425
Features: 3-piece, epoxy/glass fuselage; molded nose inlet; foam wing panels; precision-cut wood; full-size plans and photo instruction booklet.



Jet Hangar Hobbies A-7 Corsair II

turbine with minor modification; full-size plan, detailed 3-view and photo instruction booklet.

F-15 EAGLE

Turbine size: (1) 25 lb. or (2) 8 to 12 lb.
Wingspan: 56.5 in.
Fuselage length: 86 in.
Min. flying weight: 28 lb.
Price: \$995
Features: 2-piece epoxy/glass

F9F-4/5 PANTHER

Turbine size: 8 to 12 lb.
Wingspan: 52 in.
Fuselage length: 56 in.
Min. flying weight: 14 lb.
Price: \$475
Features: epoxy/glass fuselage; foam wing panels; precision-cut balsa and plywood parts; optional scale accessories; includes all wood, foam and fiberglass parts; full-size plans and photo instruction booklet.

Continued

Crow Aviation Inc. Raptor



RAPTOR

Turbine size: 25 to 30 lb.
Wingspan: 73 in.
Fuselage length: 82 in.
Min. flying weight: 25 lb.
Price: \$4,500
Features: ARF; fully molded composite airframe; custom retractable landing gear.

Fuselage length: 70 in.
Min. flying weight: 13 lb.
Price: \$899
Features: gray epoxy-coated epoxy/glass structure with molded-in fin; balsa-sheathed foam surfaces; pre-cut balsa and plywood parts; aluminum wing plug-ins; complete hardware package.

Features: turbine trainer; fiberglass fuselage and wings with exposed turbine; complete hardware; detailed construction manual.

GUEBA MODELL TECH A-10

Turbine size: (2) 17 lb.
Wingspan: 118 in.
Fuselage length: 110 in.
Min. flying weight: 36 lb.
Price: \$3,500
Features: ready-to-paint fiberglass fuselage and



Gueba Modell Tech. A-10

JET HANGAR HOBBIES F9F-8 COUGAR

Turbine size: 8 to 12 lb.

Wingspan: 47 in.

Fuselage length: 56 in.

Min. flying weight: 14 lb.

Price: \$525

Features: epoxy/glass fuselage and 3-piece inlet ducting system; precision-cut templates for wooden parts; optional scale landing gear; includes all templates and fiberglass parts; full-size plans and photo instruction booklet.

MIRAGE/KFIR

Turbine size: 8 to 12 lb.

Wingspan: 42 in.

Fuselage length: 63.5 or 67.5 in.

Min. flying weight: 14 lb.

Price: \$425

Features: epoxy/glass fuselage; foam wings; convertible turbine with minor modification; accessories available; full-size plans illustrating the five variants and photo instruction booklet.

FIREBIRD

Turbine size: 35 lb.

Wingspan: 81 in.

Fuselage length: 92.5 in.

Min. flying weight: 34 lb.

Price: \$5,900

Features: all composite airframe; pre-installed bulkheads and gear mounts; molded wing tanks.

T-33 T-BIRD

Turbine size: 18 to 22 lb.

Wingspan: 85 in.

Fuselage length: 76.5 in.

Min. flying weight: 24 lb.

Price: \$5,900

Features: molded epoxy/glass airframe; pre-installed bulkheads, wing-mounting tubes and landing-gear mounts; molded-in panel lines.

PCM MODELS

L 1011 TRISTAR

Turbine size: RAM 750

Wingspan: 85 in.

Fuselage length: 85 in.

Min. flying weight: 22 lb.

Price: \$1,425

Features: fiberglass fuselage;

sheeted-foam wings; single turbine operation; one-piece, gelcoated fiberglass nacelles.

TGA JETS

F-16 FALCON

Turbine size: 18 to 30 lb.

Wingspan: 65.7 in.

Fuselage length: 99 in.

Min. flying weight: 28 lb.

Price: \$3,900

Features: all composite construction; scale retracts available; complete hardware; accessories available.

INTERCEPTOR

Turbine size: 12 to 15 lb.

Wingspan: 45.5 in.

Fuselage length: 67 in.

Min. flying weight: 13.5 lb.

Price: \$995

Features: epoxy/glass fuselage; laser-cut ply; foam-core wing and stabilizer; prefabricated version available.

THE TOPCAT

Turbine size: 12 to 18 lb.

Wingspan: 66 in.

Fuselage length: 74 in.

Min. flying weight: 14 lb.

Price: \$599

Features: primed epoxy/glass fuselage and components; foam-core wings and stabilizer; pre-cut formers; detailed assembly manual.

Continued

Turbine Questions—answered

Q Turbine-powered models really interest me, but all my experience is with conventional prop-driven aircraft. What sort of preparation do I need to get started in turbines?

step up to the real thing, contact the AMA on the Web (www.modelaircraft.org) or by phone at (800) 435-9262 to see about becoming certified by one of their turbine instructors. Located throughout the country, these

instructors have years of experience with all of the commercially available turbine engines. This expertise is invaluable to newcomers; it will make you a safer, more successful turbine pilot, and it will help you get

the most from this exciting facet of the hobby.

Q What are the differences between a turbine-powered model and a ducted fan?

A There are a few key differences. First, a turbine unit produces tremendous heat compared with the glow engine that typically powers a larger ducted fan. The exhaust gases can reach 1,000 degrees or more, necessitating insulation to protect the airframe and other aircraft components. The typical method is to have a stainless-

steel pipe directing the thrust

straight out the tail of the aircraft. The steel pipe is surrounded by an aluminum pipe, with space between for cooling air to flow. Without this setup, the heat would melt or ignite the tail of the aircraft. Second, turbines are considerably heavier and produce significantly more thrust than ducted fans, so the structure of the model must be robust enough to withstand the additional G forces. Third, turbines use very different fuel and consume it at a much faster rate than piston engines. Early turbines used propane fuel; newer designs use kerosene, similar to the fuel used by full-size turbines. Both are relatively inexpensive compared with glow fuel, but the increased burn rate more than offsets the savings. Higher fuel consumption also means you must allow for a larger fuel tank, and you must be more careful with its placement because the model's handling can change as the fuel burns off.

Q I've seen turbines at shows; the startup procedure seems very complicated and involves lots of support equipment. What is all this stuff, and what is it used for?

A Because their operation depends on high-velocity airflow, many turbines require a source of compressed air to start the engine. Scuba tanks, air compressors and even leaf blowers can be used for this purpose. Additionally, some kerosene-powered turbines rely on a secondary propane fuel source during startup. Propane gets the turbine up to operating temperature faster. Exact procedures and required equipment vary according to the turbine's design, and the manufacturer's recommendations should always be followed.

Some newer designs incorporate built-in starting mechanisms. Some have onboard propane tanks so that no external fuel source is required during startup. Others have electronic engine-control units (ECUs) that automatically cycle the turbine and indicate when to apply air, fuel and ignition to successfully fire the engine. One or two have all this, plus an onboard electric starter motor that turns the fan blades to generate its own airflow at startup. For these units, the startup procedure requires very little external equipment.

It is important to note that the support equipment is not used just at startup. Proper care for a turbine requires flowing air through the engine after shutdown to aid in cooling and to vent off fuel vapor. This is vital to the long-term maintenance and reliability of a turbine.



A There is no single skill that automatically makes you ready to take on a turbine, but several things can contribute to your success. You should be able to handle fast, high-performance models with relatively high wing loadings. Turbines routinely fly at 150, even 200mph, so you should train your thumbs, eyes and brain to cope with the fastest models out there. A good intermediate step is to build and fly a few ducted-fan aircraft. These won't be as fast or as heavy as a true turbine, but they can give you a feel for how this type of airframe will likely respond.

When you feel you're ready to

TGA JETS

F-15

Turbine size: 12 to 15 lb.

Wingspan: 51 in.

Fuselage length: 67 in.

Min. flying weight: 13 lb.

Price: \$599

Features: all composite construction; scale retracts available; complete hardware; accessories available.

MiG-29

Turbine size: 12 to 18 lb.

Wingspan: 52 in.

Fuselage length: 76 in.

Min. flying weight: 14 lb.

Price: \$1,499

Features: all composite construction; scale retracts available; complete hardware; accessories available.

YELLOW AIRCRAFT INTL.

F/A-18 HORNET 1/10

Turbine size: 11 to 17 lb.

Wingspan: 47 in.

Fuselage length: 67.5 in.

Min. flying weight: 11 lb.

Price: \$625

Features: one-piece fiberglass fuselage with molded-in details; precut and sanded

formers and bulkheads; sheeted foam-core wings, stabilizers and vertical fin; scale retractable landing gear and accessories available.

F/A-18 HORNET 1/10

Turbine size: (1) 27 to 40 lb., or

(2) 11 to 17 lb.

Wingspan: 72 in.

Fuselage length: 98 in.

Min. flying weight: 30 lb.

Price: \$1,430

Features: one-piece fiberglass fuselage with molded-in details; precut and sanded formers and bulkheads; sheeted foam-core

wings, stabilizers and vertical fin; scale retractable landing gear and accessories available.

STARFIRE II

Turbine size: 11 to 17 lb.

Wingspan: 50.25 in.

Fuselage length: 62.25 in.

Min. flying weight: 11 lb.

Price: \$575

Features: one-piece fiberglass fuselage with vertical fin; precut and sanded formers and bulkheads; sheeted foam-core wings and stabilizer; accessories available.

Please turn to page 200 for a list of manufacturers.



Yellow Aircraft Intl.
F/A-18 Hornet

Jet Rally Events

about jet models from people who design, build and fly them, this is the place to go. They can be reached on the Web at www.jetpilots.org; from there, you can find out more about the JPO and the regional chapter near you, sign up for membership, subscribe to newsletters and mailing lists and keep up on the latest news in the turbine community.

Here is a list of some upcoming jet events around the U.S. and how to find out more about the ones near you.

JANUARY

Jets Over Deland

Deland, FL
(901) 228-0700
brutusit@webtv.net
www.delandrcclub.com
or bodo@bitstorm.net

MARCH

Florida Jets

Bunnell, FL
(800) 735-0401
www.franktiano.com
or (954) 761-1500

Tucson Jet Rally

Tucson, AZ
wclays@prodigy.net

Jets Over Texas

Hearne, TX
(979) 778-9464
ps2727@aol.com

LA Jets

Van Nuys, CA
bgwc@earthlink.net

APRIL

Bomber Field Jet Rally

Monaville, TX
(218) 894-8046
www.bomberfield.sytes.net

Central Texas

Jet Rally

Austin, TX
bcovish@juno.com

MAY

Okefenokee

R/C Jet Rally

Waycross/Ware Cty., GA
(912) 285-8022
lasuga@accessatc.net

Jets over Arrowhead

Rice Lake, WI
(715) 234-4856

San Jose Jets

San Jose, CA
servochatter@sccmas.org
www.sccmas.org

Mississippi Afterburner

Winona, MS
(601) 856-3377
rugbaron@netdoor.com
www2.netdoor.com/~jetjock/missgang/
or (601) 924-1460
or vernonms@aol.com

Mid Atlantic Fan Fly

Chesapeake, VA
(804) 479-4905
franklyboy1@cs.com

JUNE

Denver Jet Rally

Denver
DLassek@cs.com

Quinte Jet Rally

Belleville, Ont., Canada
(613) 475-3786
leeandmarg@quintenet.com
www.reach.net/~bqac/



Jets over the Heartland

Rochester, IN
TimandTracy@netscape.net

JULY

Greater Cincinnati Jet Rally

Oxford, OH
(513) 742-0767
amato_jj@hccanet.org
www.cincyjets.rcclubs.com

Lilac City Jet Rally

Spokane, WA
(509) 466-0827
dhunt@spocom.com

Green Mountain Jet Rally

Middlebury, VT
(802) 775-3000

Viper Performance Jet/Scale Rally

Innisfail, Alberta, Canada
(403) 302-0283
viperperformance@hotmail.com
www.helijet.ca/Viperperformance.jpg

Michigan Jets

W. Bloomfield, MI
(248) 626-8838
www.electrodynam.com/mi_jets/index.htm

AUGUST

Missouri Valley Jet Scramble

Lincoln, NE
wneesen@conl.com
www.mitec.net/~schu777/JetScramble2001.html

T-38 Jet Rally at Reese Center

Lubbock, TX
(806) 794-9474
summit120@prodigy.net
<http://members.aol.com/rsjoma3/t-38jetrally.html>

LaChute Jet Rally

Quebec, Canada
(613) 632-4701

Jets over Whidbey

Coupeville, WA
(253) 891-2437
royholt@frugal.com
www.frugal.com/~royholt/whidbeyjets/indexx.html

Heart of Ohio Jet Scramble

Columbus, OH
rsjoma4@aol.com
www.jetadic.com

SEPTEMBER

Maine Jet Rally

Biddeford, ME
(207) 883-5327
ics@icommercesystems.co
www.icommercesystems.com/mainejets/ or (207) 797-5196

Greater Southwest Fan Fly

Caddo Mills, TX
Gpulcini@aol.com
www.ntxjets.org

OCTOBER

Superman

Metropolis, IL
www.pro-mark.com

HOTMAC Jet Rally

Waco, TX
(254) 662-5587
BPAMAX@aol.com
or (254) 776-4991

NOVEMBER

Florida Intl. Jet Rally

Lake Wales, FL
(863) 667-1785
fijjets@aol.com

Arizona Jet Rally

Mesa, AZ
(602) 892-1510
bruff1@worldnet.att.net ✈

35th Annual
RHINEBECK
JAMBOREE

by Gerry Yarrish



Coming in for a low pass, one of the 1/3-scale Balsa USA Pups makes a pretty picture.

A dream of early aviation

One of the most popular aviation attractions

in the Hudson Valley area of NY

is a little grass strip and a collection of

rusty hangars known as the Old Rhinebeck Aerodrome. This magical place nestled in wooded hills is home to about 50 antique aircraft ranging in vintage from 1909 to the 1930s and '40s. Several of these priceless craft fly regularly on weekends during the Aerodrome's airshow season.

If ever a place was ideally suited for a vintage RC model airplane meet, it surely is this bumpy grass runway in historic Rhinebeck, NY.



The award-winning DH-88 Comet built by Fred Coleman of the WRAM club. Simply beautiful.



A pair of Sopwith Pups flies in close formation.



Nick Zirolli Sr.'s 1/4-scale Ryan Spirit of St. Louis is part of the model demonstration airshow.



Thirteen-and-a-half-year-old Chris Mair was the meet's youngest registered pilot, and he flew his 1.20-powered Flair Fokker triplane. Many older pilots wished they could land their models as nicely as Chris landed Lola.



On September 8 and 9, 2001, the Mid-Hudson RC club hosted its 35th annual WW I and vintage scale-model Jamboree—one of the biggest yet. Held in conjunction with the Rhinebeck airshow, this combination of full-size and

miniature scale aircraft is a unique experience. More than 150 modelers came from around the country to renew old friendships and to fly their models from the Aerodrome's runway. This annual event is open to anyone with a scale RC model of an aircraft that flew prior to 1939, from the earliest pioneer aircraft and WW I fighters to classic biplanes and barnstormers; as long as they weren't combatants in WW II, all types of models are welcome. Contest director Tom Smith and the members of the Mid-Hudson RC club did a fine job once again, and the weather, as always, was picture perfect.

Over the years, giant-scale models have become the most popular Jamboree entries, but smaller, beautifully detailed models also shared the sky over the Aerodrome. Before the full-size airshow began, several modelers flew demonstration flights to show the crowd what the hobby is all about. Nick Zirolli Sr. flew his impressive 1/4-scale Spirit of St. Louis. This Golden Age icon has a 138-inch span, is powered by a 4.2ci gasoline engine and has an electronic sound system. Nick flies his Spirit high over the runway, idles back the engine, and when he hits the switch, you can clearly hear, "Which way's to Ireland?" Hearing this famous phrase from the Jimmy Stewart movie, "The Spirit of St. Louis," let you believe that Jimmy himself was inside Nick's plane asking for directions!

Arizona autogyro

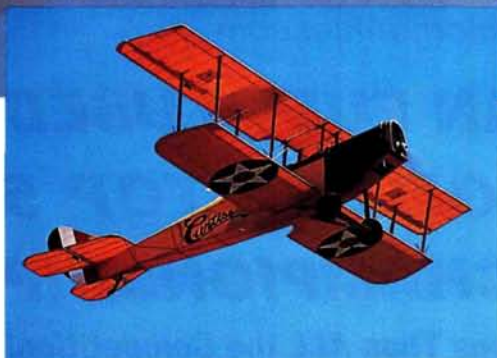
During the special model demonstration, everyone was treated to seeing Steve Tillson fly his scale, 1937 Kellett YG-1B autogyro.

The Kellett is a large model with a 74-inch rotor span powered by a Saito .91 4-stroke engine that's completely hidden by a dummy scale radial engine. The autogyro has no wings or ailerons for roll control; the rotor tilts left and right. The rotors on an autogyro are not mechanically powered; they are kept spinning (and thus produce lift) by the upward flow of air through the disc as the model's tractor propellers pull it forward. The model took off and performed nicely in the breezy conditions, but it is a bit susceptible to crosswind.

To learn more about this and other autogyro kits, contact Steve at the Autogyro Co. of Arizona, 3307 W. Renee Dr., Phoenix, AZ 85027; (623) 582-9428; www.autogyro-rc.com.



Larry Alles of Flemington, NJ, flew his 40-percent Waco YMF-5. Powered by a twin-cylinder 3W 120 B2 engine turning a Menz 32-inch prop, the Waco was equipped with smoke.



Tim Hagerty's Jenny hangs on its prop and acts like a kite in the gentle breeze.

Also wowing the crowd was a group of modelers flying Balsa USA 1/3-scale Sopwith Pups. Seven of these 9-foot biplanes, powered by everything from Quadra 52s and Zenoah G-62s to the twin-cylinder G-445 engine, put on an excellent display. On several low passes, two and often three Pups flew by in extremely close formation. But mostly modelers come simply to fly their models and have fun. The photos in this article only scratch the surface of the magic that's present at the Aerodrome.

FRIDAY'S SPECIAL EVENT

Usually the Jamboree is a weekend affair, and many modelers arrive on Friday to set up and put in an extra flight or two. The



How's this for a colorful scale paint job? Mike Baiano's Sachs 4.2-powered Pup was painted by his wife, Patty; it's a scale trainer paint scheme.



This Albatros is the handiwork of Dave Johnston of the Ellington RC club.

full-size airshow is flown on Saturday and Sunday at 2 p.m. Typically, the early pioneer

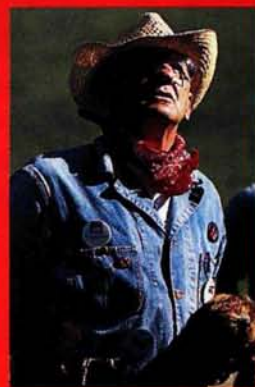
aircraft fly on Saturday, and the Sunday airshow features WW I aircraft. This year, however, those who arrived early on Friday were treated to a very special afternoon airshow of *all* the Aerodrome's flyable aircraft. This special event was arranged in recognition of the Thomas Thompson Trust's contribution of \$25,000 to the Rhinebeck Aerodrome Museum. The Trust's challenge grant had been set up to encourage the Aerodrome's \$50,000 fund-raising goal. The surpassed goal of \$75,000 raised will help in operating the museum and the Aerodrome for future generations.

WW I was a simpler time, and the aircraft of that era were as



STANLEY SEGALLA—THE FLYING FARMER

Affectionately known as the "Flying Farmer," Stanley Segalla has thrilled crowds at the Old Rhinebeck Aerodrome for well over 30 years. Stan, with his super low and slow aerobatic antics in his PA-11 Piper Cub Special—often flown below treetop level—remains one of the Aerodrome's most popular airshow acts. Stan's airplane may be 100 percent stock, but the maneuvers he puts his little yellow aircraft through, both with the engine running and deadstick, are anything but stock! If you've never seen Stan's Flying Farmer routine, that's reason enough to visit the Aerodrome. You won't believe your eyes!



Spirit of St. Louis project



Reeve Lindbergh (Charles's daughter) sits in the Aerodrome's "Spirit" reproduction.

In celebration of the 75th anniversary of Charles Lindbergh's historic Atlantic crossing, the Old Rhinebeck Aerodrome is constructing an exact full-size reproduction of the Ryan Spirit of St. Louis. Begun several years ago by Cole Palen, the aircraft will become part of the Aerodrome's airshow. Several of the museum workers and many volunteers have been working on the Spirit, now well on its way to



meeting its completion date of April 30, 2002. This flying reproduction will be very close to the original aircraft's design: it won't have any brakes or a steerable tailwheel—exactly what you'd expect from the Rhinebeck Aerodrome.

The 46-foot long, one-piece Spirit wing is an impressive sight.

beautiful as they were deadly. If you enjoy building these types of vintage models, or you have an interest in early aviation history, mark your 2002 calendar for the first weekend after Labor Day and make the trek to

Rhinebeck. Amidst the smell of burnt castor oil, the roar of rotary engines and hundreds of models to see, you'll never forget the experience. ✈

One man's dream



Just restored, this Curtiss Jenny is the same one that Cole purchased in 1951. It flies as good as it looks.



The beautiful and delicate-looking Demoiselle piloted by Bill King is awesome to watch.



Left: the infamous Bloody Black Baron of Rhinebeck points his scepter as he heckles the crowd. Right: since his Fokker triplane was damaged last year, the Baron gets around in this beautiful Albatros DVa. What a job he has!



Another reason to attend the annual Rhinebeck RC Jamboree is simply to see all the wonderful aircraft in the museum. Set on top of the hill across from the Aerodrome, a number of hangars—all built by the Aerodrome's founder, Cole Palen—house the Aerodrome's collection of antique aircraft. Cole's aeronautical adventure started in 1951, when he purchased six WW I airplanes from Roosevelt Field. It took his entire life's savings, and from those six aircraft, he pieced together one complete Curtiss Jenny (it still flies today!). In 1956, Cole started flying a Spad XIII and in 1958, he purchased an old, rundown farm that eventually became today's Aerodrome. By 1959, Cole had chopped a rough and very short runway out of the wooded farmland, and soon other aviation-minded folks started hanging around the place. The weekend airshows began in 1960, and in the beginning, more people were in the show than in the audience!

Cole Palen died on December 7, 1993, but his dream lives on through the work and dedication of the many volunteers who operate the Old Rhinebeck Aerodrome and Museum.

Aerodrome's flying airshow aircraft

- Albatros DVa (replica)
- Aeronca C3
- Blériot XI
- Caudron G3
- Curtiss Jenny JN4H
- Curtiss Junior
- Curtiss pusher biplane
- Davis DI-W
- De Havilland Tiger Moth
- Demoiselle
- Fokker D-VII (replica)
- Fokker D-VIII (replica)
- New Standard D-25
- Nieuport XI (replica)
- Pietenpol Aircamper
- Sopwith Camel
- Spad XIII (replica)
- Stampe biplane

Note: the Fokker triplane flown by the Bloody Black Baron of Rhinebeck was damaged last summer in a ground-loop accident and is being repaired for the 2002 airshow season.

For more information, contact: Old Rhinebeck Aerodrome, P.O. Box 229, Rhinebeck, NY 12572; (845) 752-3200; info@oldrhinebeck.org; www.olderhinebeck.org.

THUNDER TIGER
SEAMASTER
40 ARF



SPECIFICATIONS

Model: Seamaster 40 ARF

Type: sport amphibian

Manufacturer: Thunder Tiger USA

Distributed by: Ace Hobby
Distributors Inc.

Wingspan: 59½ in.

Wing area: 725 sq. in.

Weight: 6 lb., 12 oz.

Wing loading: 21.5 oz./sq. ft.

Engine req'd: .40 to .46 2-cycle,
or .54 to .60 4-cycle

Engine used: Thunder Tiger Pro
.46 2-cycle

Prop used: Master Airscrew
11x6

Radio req'd: 4-channel w/4 servos

Street price: \$199

Features: built-up balsa and
lite-ply ARF covered with
Ultracote. One-piece wing;
blow-molded engine pod; com-
plete hardware package with
tank, spinner, engine mount,

decals and wheels; converts
from a seaplane to a land plane
in minutes.

Comments: the Thunder Tiger
Seamaster 40 ARF is a great
way to get your feet wet! It's
easy to assemble and looks
great when completed. The
Seamaster 40 flies very well and
handles the water equally well.
Modelers who have limited time
to build but who have wanted to
try a seaplane will be very satis-
fied with the Seamaster 40 ARF.

HITS

- Excellent water handling and flight performance.
- Good overall appearance.
- Easy to assemble.
- Kit is complete.

MISSSES

- Engine-mounting bolts are too short.
- Hinges don't match instructions.

by Jim Onorato

To say that the Seamaster model is a classic would be a vast understatement. Introduced in the 1980s, the Seamaster has remained one of the most recognizable amphibious model airplanes. During the last two decades, modelers have flown Seamasters from many lakes and ponds. Memories of this enduring airplane have remained in the hearts of every modeler who ever owned one—including yours truly. I built a Seamaster in the late '80s and have flown it every year. Although I had to repair it after an unfortunate accident caused by battery failure, the old bird is still in pretty good shape, and it still flies as well as it ever did.

Now modelers can enjoy the thrill of flying from their favorite lake without having to assemble a kit. The new Seamaster 40 ARF, manufactured by Thunder Tiger and distributed in North America by Ace Hobby Distributors Inc., is completely built and expertly covered with Ultracote, so you can head for the water with minimum effort. If you can't get to the water, the Seamaster can be converted to a land plane in just a few minutes; it's a true amphibian.

WHAT'S IN THE BOX?

The answer is easy: everything. You need only add a .46-size engine, a prop, radio equipment and fuel tubing. When I opened the box, I was pleasantly surprised because I immediately saw that this was going to be a simple project. This rugged balsa-and-ply model was completely built and covered. Mounting parts are attached to the one-piece wing. The fuselage is of ply construction, and the kit includes a complete hardware package. The manual consists of 12 pages, six of which concern the assembly procedure. The rest of the manual covers materials needed, parts drawings and tips for flying off water.

*Classic seaplane in
ARF form*

PHOTOS BY WALTER SIDAS & JIM ONORATO



FLIGHT PERFORMANCE



The first flights took place on a beautiful morning with a slight breeze. Having flown my original Seamaster many times before, I knew what to expect, but as with any first flight, I was eager to get under way. I packed the necessary support equipment in my boat and set out for the middle of the lake.

• TAKEOFF AND LANDING

I fired up the Thunder Tiger Pro .46, and after making sure it had a reliable idle, I set the Seamaster 40 in the water and taxied out. The water rudder was very effective, and it was simple to steer the Seamaster 40 away from the boat and point it into the breeze. I slowly advanced the throttle and watched the Seamaster 40 rise up on step quickly as it accelerated. I used a little aileron to keep the wing level during its takeoff run. When the plane reached flying speed, a touch of up-elevator was all it needed to lift smoothly into the air. For me, watching the water stream off the fuselage is one of the coolest aspects of flying off water.

Landings are much like those on land, except you don't land at a full flare stall. Also, landings on water are best achieved with a little speed. This allows the plane to skim along after touchdown and makes it easier to accelerate and keep flying if the plane bounces on landing. The Seamaster 40 has a very gentle glide slope and is easy to land. Long approaches with a bit of

throttle and the plane level result in perfect landings every time. After touchdown, I pulled the throttle back to idle and let the plane slow down on its own unless I was doing my favorite maneuver—touch-and-go's (or more appropriately, "splash and dash").

• GENERAL FLIGHT PERFORMANCE

The Thunder Tiger Pro .46 was a good match for the Seamaster. It provides sufficient power for relatively fast flying and a reliable idle to let the plane fly slowly and realistically. The huge, constant-chord, symmetrical wing gives the Seamaster a great deal of stability. The plane was responsive to controls at all speeds and did not exhibit any bad tendencies. It tracks very well and flies smoothly at all speeds.

• AEROBATICS

At the risk of stating the obvious, the Seamaster was not designed for aerobatics. Having said that, let me add that it is capable of rolls, loops, spins, snaps and most of the maneuvers the average Sunday flier wants a plane to do. It doesn't like to fly inverted and has to be coaxed into a spin, but the Seamaster is simply a blast to fly!



As you can see, the Thunder Tiger Seamaster 40 ARF comes with a complete hardware package. The multi-colored scheme is Ultracote.

WING ASSEMBLY

Assembly starts with the one-piece wing, which has a constant chord with a thick, symmetrical airfoil and strip ailerons. Wing assembly consists of hinging the ailerons and installing the aileron servo tray and the servo. The manual refers to the hinges as "CA" hinges and says to glue them with thin CA. The hinges included in my kit were pinned hinges that I secured with

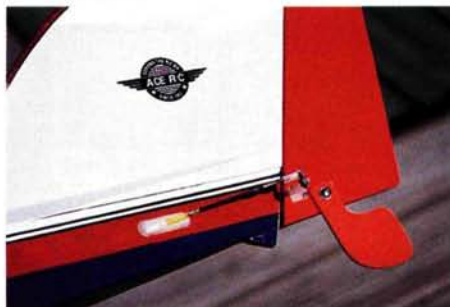
epoxy. I was told that future kits would have an addendum stating that the pinned hinges are correct. Sticky-back hook-and-loop fastener is provided to attach the precovered tip floats to the wing, but I didn't think the hook-and-loop fastener provided enough security. Since I had no intentions of flying the Seamaster without the tip floats, I attached them

with double-sided tape, which held them much more securely.

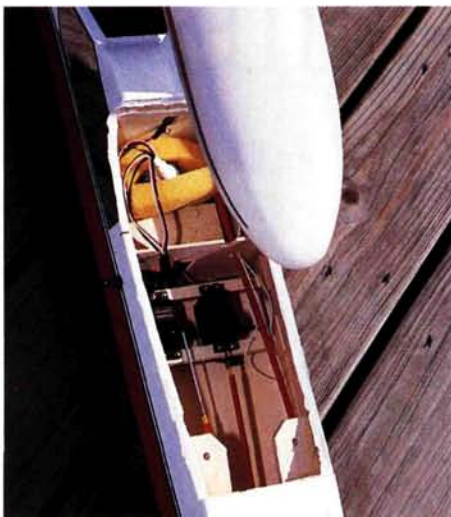
FUSELAGE ASSEMBLY

The firewall, firewall braces and engine pylon are made of 7-ply, 1/2-inch plywood. I epoxied the parts together and reinforced the firewall/pylon joint with the screws provided. I fuelproofed the whole assembly by coating it with epoxy thinned with alcohol. I screwed the adjustable engine mount to the firewall with four bolts and blind nuts (the bolts provided were too short; I had to replace them with longer ones). The engine pod is blow-molded plastic and comes in one piece that needs to be trimmed. I separated the front from the rear with a Zona saw and cut out the rectangular opening in the bottom of the rear piece where it slides over the pylon.

Next, I side-mounted a Thunder Tiger Pro .46 engine and trimmed the engine pod to clear the cylinder head, muffler, needle valve and carb. I mounted a standard-size servo for the throttle to the right side of the engine pylon behind the firewall, again using double-sided tape. The throttle linkage consists of a music-wire pushrod with a



The plastic water rudder is simply bolted to the rudder and provides excellent steering on the water. It can just as easily be removed for land operations.



The fuselage has plenty of room for radio installation. I wrapped the receiver in a plastic bag and then in foam rubber. To prevent water from seeping in, use silicone sealant to seal the wing saddle.

Z-bend at the carb throttle arm and an EZ connector on the servo end. The servo cable goes into a slot that is machined in the rear of the engine pylon.

I assembled the fuel tank, wrapped it with foam rubber and placed it in the rear of the engine pod. The pylon assembly slides into a pocket in the top of the fuselage and is fastened with a single screw. I left the pylon assembly off until the plane was finished so it wouldn't get in the way.

The fuselage is made entirely of lite-ply with a plastic nose cone and requires almost no work to complete. The fuselage contains two pre-installed brass tubes to accept the main gear and the hardware required to attach the nose gear. Since I wasn't going to fly the Seamaster from land, I skipped the steps for installing the landing gear.

I next removed the covering from the openings for the engine pylon and the forward hatch. The Seamaster has two access hatches; one in the nose, in case you have to reposition the receiver battery for proper balance, and one in the rear to install and maintain the rudder and elevator linkage. I was able to install the rudder and elevator pushrods without cutting open the rear hatch, thereby avoiding making an opening in the fuselage that could be a source of water leakage.

FINAL ASSEMBLY

The trickiest part of assembling the Seamaster was the installation of the tail feathers. Instead of first gluing the vertical fin to the fuselage and then gluing the stab to the fin, I first epoxied the stab to the fin. It was easy for me to keep the stab and fin perpendicular to each other by placing the stab upside down on my workbench and using a 90-degree triangle to keep the pieces aligned until the epoxy had cured. Next, I turned the fuselage upside-down, blocked it

up and epoxied it to the fin. When I had finished, everything came out nice and square.

I hinged the rudder and elevators using the provided hinges and inserted the pushrods from the rear of the fuselage. I then placed the servos in the pre-installed servo tray and hooked up the rudder and elevator with the provided hardware. I attached the plastic water rudder to the rudder with a bolt and locknut and glued the formed plastic keel to the bottom of the fuselage with Zap-a-Dap-a-Goo. I wrapped the receiver and battery in plastic bags, installed the receiver in front of the servos and placed the battery in the nose. I mounted the switch harness on the left side of the fuselage and then sealed the joint between the wing and fuselage with silicone sealant. To finish up the Seamaster, I added the decals and then, using chrome trim over black, I also added a windshield and side windows.

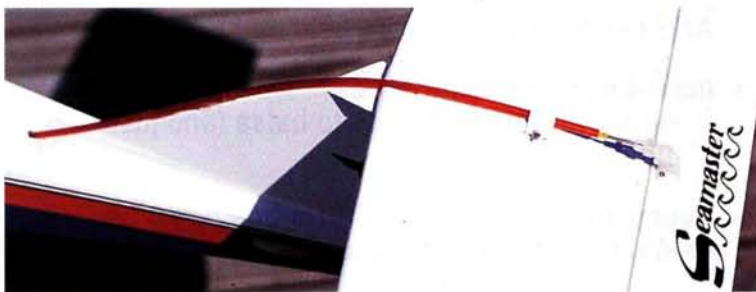
CONCLUSION

The Seamaster 40 is a well-made ARF that is extremely easy to assemble and looks great when finished. Thunder Tiger has made it simple to get on the water fast by bringing back this modeling classic in ARF form. If you've wanted to try flying off water but don't have the time to build a kit, try this one. I'm sure you'll like it! ⚡



Above: the Thunder Tiger Pro .46 is a good match for the Seamaster and fits easily. I mounted the throttle servo on the pylon using double-sided tape. Be sure to seal the wood for proper adhesion. Right: the completed motor installation is simple and neat. The blow-molded pod is sturdy and houses the throttle servo and fuel tank.

The elevator pushrod snakes its way to the top of the elevator. The cable pulls the elevator up, and this eliminates the possibility of the pushrod flexing during maneuvers. Note the clamp that secures the pushrod to the stabilizer.



Ace Hobby Distributors, 116 W. 19th St., Higginsville, MO 64037-0472; (800) 322-7121; (660) 584-7121; fax (660) 584-7766; tech support (660) 584-6723; acehobby@ctcis.net; www.acehobby.com.
Master Aircscrew; distributed by Windsor Propeller Co., P.O. Box 250, Rancho Cordova, CA 95741; (916) 631-8385; fax (916) 631-8386; www.masteraircrew.com.
Thunder Tiger USA; distributed by Ace Hobby Distributors.
Ultracote; distributed by Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, IL 60651; (773) 626-9550; www.goldbergmodels.com.
Zap Glue, 9420 Santa Anita Ave., Rancho Cucamonga, CA 91730; www.zapglue.com.
Zona Tool Co., Box 502, Bethel, CT 06801; (800) 696-3480; fax (800) 299-4208.



KYOSHO

SUKHOI

SU-31

Easy-build aerobatic all-star

BREITLING

by Craig Trachten

The Sukhoi has been my favorite aircraft for as long as I can remember. I don't know if that's because of its appearance or the way it performs, but the way I see it, it's the best design out there. So when the opportunity arose, I jumped at the chance to review Kyosho's Su-31 Sukhoi. Sukhoi style and performance, with Kyosho quality—for me, it doesn't get any better than that. It is a treat just to inspect the construction and covering of this kit. When trial-fitting the parts, you can really appreciate the beauty of the kit's design. This is an aircraft that can easily go from box to field in one day's time, and you just know that a Sukhoi is going to be a blast to fly when you get there.



SPECIFICATIONS

Model: Sukhoi Su-31 Super Quality Series

Manufacturer: Kyosho

Distributor: Great Planes Model Distributors

Model type: scale sport aerobat

Wingspan: 54.3 in.

Wing area: 540 sq. in.

Length: 49.4 in.

Weight: 6.44 lb.

Wing loading: 27.46 oz./sq. ft.

Engine req'd: .40 to .46 2-stroke, or .48 to .53 4-stroke

Engine used: O.S. .70 Surpass 4-stroke

Prop used: Master Airscrew 13x6

Radio req'd: 4-channel

Radio used: Futaba 8UAF w/5 S-148 servos and R148DF receiver

Fuel used: Morgan Omega 15% 4-cycle

Street price: \$229.99

Features: all-balsa construction, 90-percent assembled; painted, fiber-glass-reinforced plastic cowl and wheel pants; engine mount, fuel tank and landing gear included; fully covered with Breitling decal scheme.

Comments: this kit deserves its "Super Quality Series" name. The construction is topnotch, and the decals look great. It goes together easily and is exciting to fly.

HITS

- High-quality all-balsa construction.
- Beautiful scale trim and decals.
- High-performance flight characteristics befitting a Sukhoi.

MISSES

- The English translation of the instructions could be clearer.



As is typical of Kyosho, the Sukhoi kit is very complete. It comes 90-percent assembled, with all-balsa construction and prepainted, fiber-glass-reinforced cowl and wheel pants. Also included are the fuel tank, linkages and landing gear, which feature a steerable tailwheel. The Sukhoi comes fully covered with a really nice, scale Breitling trim scheme.

ASSEMBLY

Begin construction by attaching the ailerons to the wings. CA hinges are provided, but be careful not to apply too much CA, as it

will wick its way to the underside of the wing. I apply the CA to the hinges using Bob Smith's fine CA applicators (part no. 322). You can get right down to the hinge material without fear of gluing the aileron to the wing. Epoxy the wing joiners together. While you are waiting for that to set, remove the covering from the two holes on the top of the wing where your servo leads will exit. The factory has installed strings in the wing to help you pull the leads through. Make sure you feed them through the holes and then epoxy the wing halves together. Wrap a piece of masking tape around the root of each wing half. When the epoxy has set, removing the tape



It comes as no surprise that Kyosho's Sukhoi ARF is well designed, nicely built and very complete. The construction is all balsa, and the cowl and wheel pants are pre-painted, fiberglass-reinforced plastic.

removes any epoxy ooze.

To save time, I jumped ahead in the instructions while the wing was curing and installed the engine. This aircraft cries out for a 4-stroke, although it will fly fine with a 2-stroke .46. My engine of choice was an O.S. .70 Surpass 4-stroke. I find it much easier to line up the mounting holes if I first attach the engine to the mount and then use the entire assembly as my template. For proper cowl clearance, measure from the back of the mount to the thrust washer. Nothing is more annoying than having to move the engine because you can't put the prop on with the cowl in place. Using the assembled mount/engine, mark and drill the holes for the blind nuts. Note where your throttle cable needs to be, then mark and drill. When you've epoxied the blind nuts to the back of the firewall, you can set the fuselage aside temporarily and go back to the wing.

Tie the chase strings to the servo leads, and feed them through the wings. Secure the servos to the wings with four screws. Mount the horns, measure and bend the pushrods and install them as instructed. Cut the covering away from the area where the wing-mounting screw plate is to be glued. Use the predrilled holes in the wing as a guide to drill through the plate. Mount the wing on the fuselage and check for alignment; my kit required no adjustment.

Right: the O.S. .70 Surpass is a bit bigger than the recommended 4-stroke engine, but a little extra horsepower never hurts, especially on a high-performance aerobatic aircraft such as the Sukhoi. It spins a big Master Airscrew 13x6 prop, which gives great vertical performance. Far right: the radio box is roomy and easy to access, but the fuselage tapers rather sharply, so installing the pushrods can be something of a challenge. Feeding pushrod chases in from the rear makes the job a lot easier.



FLIGHT PERFORMANCE

Even though it's an ARF, the Kyosho Sukhoi Su-31 is a purpose-built, high-performance aircraft, so it's both challenging and rewarding to fly.

• TAKEOFF AND LANDING

The scale wheels look great, but they make ground handling on rough grass fields a bit tricky. They necessitate a long takeoff roll, but once up, the Sukhoi climbs strongly, thanks to the O.S. .70 4-stroke. This is good because the Sukhoi doesn't like to slow down. On approach, you should definitely keep your speed up. This makes it land a bit hot, but that's better than slowing too much and risking a tip-stall. The recommended left- and right-trim settings were right on, but the plane needed down-trim to fly level.

• LOW-SPEED PERFORMANCE

The Sukhoi wasn't designed for low speed, and it should probably be avoided when possible. The Sukhoi's normally sharp reflexes dull considerably at slow speeds, and the plane feels out of its element.

• HIGH-SPEED PERFORMANCE

This plane really comes into its own at speed. The big O.S. 4-stroke likes Morgan 15-percent Omega fuel. It and the Master Airscrew 13x6 get the Sukhoi moving effortlessly. The top-end speed is quite good, and it tracks exceptionally well.

• AEROBATICS

The name Sukhoi is synonymous with aerobatic performance, and this model definitely delivers the goods. Rolls are fast and very axial. The plane loops at will and performs great spins and snap rolls. The plane does require a little forward stick to fly inverted. Overall, this is a very exciting plane to fly—just as a Sukhoi should be.



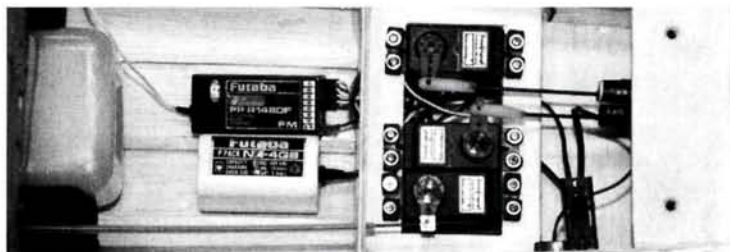
Epoxy the belly pan to the wing, and wing construction is complete!

Install the main landing gear according to the instructions. It took a little finessing to get the axle screws through the pants and wheel. Tighten everything down, and check that the wheels rotate freely without wobbling. Secure the gear assembly to the fuselage with the provided hardware, then epoxy the landing-gear-bracket cover into place. Recess the area where the gear-mounting screws are so the cover sits flat over them.

Installing the empennage is quick and painless; remove the covering material where the tail feathers meet the fuselage. The

horizontal stabilizer slides into a slot in the fuselage; the fit was nice and tight, so I wicked in thin CA for the initial bond. This by itself would not be strong enough, but a healthy dose of 2-hour epoxy in the vertical stab slot bonded the horizontal and vertical stabilizers to the fuselage.

The supplied pushrods use the typical hardwood dowel and wire construction. The dowels were stiff and short enough to eliminate any concerns about flexing. Installing the pushrods through the long, tapering fuselage can be a challenge. To make your life easy, take a few pushrod chases and feed them in through the exit holes toward the radio tray. Insert the pushrods into the chase and push! The rods will slide through the fuselage and right out the exits. Attach the tailwheel and bracket



as instructed. Attach the elevator and rudder with CA hinges the same way as you installed the ailerons. Mark the locations for the control horns, and install them.

My least favorite step in building any airplane is the cowl installation. It is not difficult, but it is time-consuming if you want a good, clean fit. The process is repetitive: cowl on, mark, cowl off, trim. I do this as many times as necessary. I'd rather go through the cowl on/off cycle a few extra times and get it right than mark and hack and end up with large, ugly openings. Go slowly—you can always remove a little more material, but you can't replace it.

An 8-ounce fuel tank is supplied, but since I installed a .70 4-stroke, I opted for a larger tank. I used a Great Planes 14-ounce tank (part no. GPMQ4106). I placed a piece of lite-ply in the nose to create a platform for the tank. If you do this, do not forget to slot the platform to accept the front wing-mounting peg (I did forget, and I had to break out my motor tool to cut the slot after the fact).

The final step in the construction is the canopy installation; paint and cut along the



Kyosho provides complete hardware with the Sukhoi, including linkages, landing gear and a steerable tailwheel.

molded lines. A pilot figure adds the finishing touch. A scale sport pilot is most appropriate, but I chose Buzz Lightyear to pilot my ship, compliments of McDonald's.

All that's left is to apply the decals. I find the "wet" application method the easiest, especially for large decals. Spray the area where the decal is to be applied with window cleaner before you apply the decal. The window cleaner will allow you to slide the decal into its final position. Wet the top of the decal with window cleaner to act as a lubricant and then squeegee it away, working from the center outward. An old credit card makes an excellent squeegee.

CONCLUSION

Building Kyosho's Sukhoi Su-31 was an absolute pleasure. It went together easily, required little assembly time and looked fabulous when it was done. Kyosho knows how to produce a first-class ARF. As is proper for a Sukhoi, this plane is a high-performance aerobatic aircraft and as such, it is not meant for beginners. Pilots with experienced thumbs, however, will have a blast. There is nothing better than building a well-designed, expertly manufactured kit of your very favorite airplane—except flying it! ✚

Bob Smith Industries, 8060 Morro Rd., Atascadero, CA 93422; (805) 466-1717; fax (805) 466-3683; www.bsiadhesives.com.

Futaba Corp. of America; distributed by Great Planes Model Distributors Co.; www.futaba-rc.com. **Great Planes Model Distributors**, P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008; www.greatplanes.com.

Kyosho; distributed by Great Planes Model Distributors; www.kyosho.com.

Master Aircrew; distributed by Windsor Propeller Co., P.O. Box 250, Rancho Cordova, CA 95741; (916) 631-8385; fax (916) 631-8386; www.masteraircrew.com.

Morgan Fuels; a division of Morgan Inc., P.O. Box 1201, Enterprise, AL 36331; (205) 347-3525; fax (205) 393-4852.

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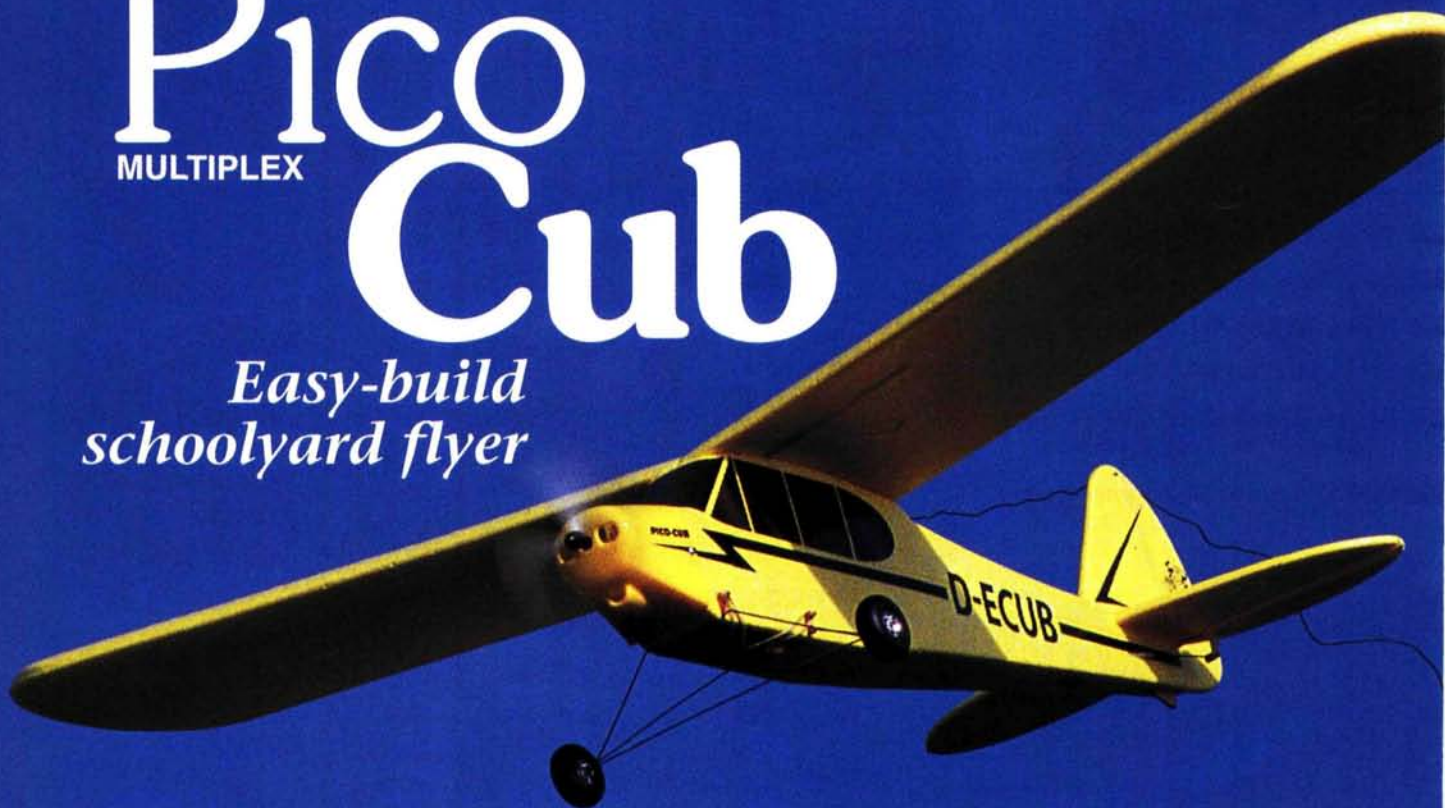


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Pico MULTIPLEX Cub

*Easy-build
schoolyard flyer*



PHOTOS BY WALTER SIDAS

by Jim Onorato

When it comes to personality and appeal, you just can't beat a Cub, and models of Cubs come in all shapes and sizes. This Pico Cub from Multiplex USA is made of yellow Styrofoam and has a yellow, vacuum-formed plastic cowl. It comes with a Permax 400 6V motor, a 5x4.3 propeller, all the necessary hardware, landing gear, decals, a Pico 400 ESC and two MX-X2 microsensors. It does not have to be painted, and you can assemble it in just a few hours. If you'd like to fly your Pico Cub off water, a pair of foam floats is also available.

SPECIFICATIONS

Model: Pico Cub

Manufacturer: Multiplex

Type: electric sport-scale ARF

Wingspan: 45.7 in.

Wing area: 383 sq. in.

Weight: 23 oz.

Wing loading: 8.7 oz./sq. ft.

Length: 30.9 in.

Radio req'd: 3-channel

Airborne system used: Multiplex Micro IPD receiver; 2 MS-X2 servos; Pico 400 ESC (kit now comes with ESC and servos plus a 6-cell, 600mAh battery pack)

Drive system included: direct-drive Permax 400 and 5x4.3 prop

Battery: 6-cell, 1100mAh NiMH, or 7-cell, 800mAh Ni-Cd

Flight duration: 6 to 11 minutes

Prices: \$150 (model with airborne and drive systems), \$325 (model with airborne and drive systems plus 4-channel Pico transmitter and charger)

Features: constructed of molded yellow Styrofoam with plastic cowl; motor and propeller included. Under-cambered wing and flat tail feathers; decals provided; no painting required.

Comments: extremely easy to assemble, the Multiplex Pico Cub is a relaxing flyer that looks good in the air.

HITS

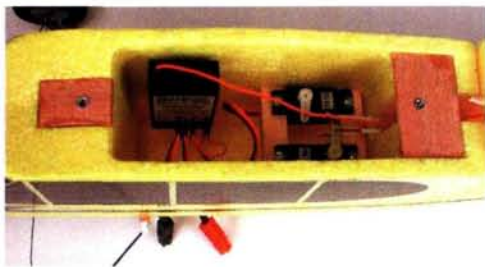
- Good flight performance.
- Easy assembly.
- Nice overall appearance.

MISSSES

- Parts identification could be improved.



Left: for \$150, the Pico Cub comes with everything you see here, as well as two microsers, an ESC and a 6-cell battery pack. Below: a Speed 400 motor and a 5x4.3 prop are included; the motor is simply glued to the plywood plate in the Cub's nose. This setup provided ample power, but a geared motor upgrade is available for those with a need for speed.

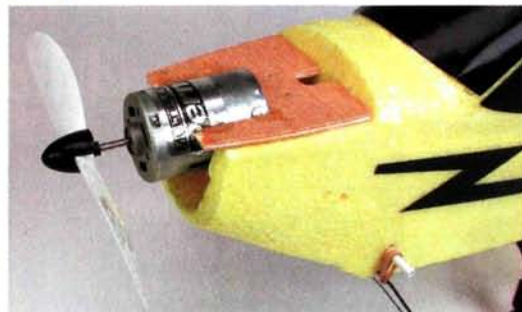


There's ample room in the fuselage for the receiver (held with hook-and-loop fastener) and two servos (screwed into trays that I epoxied into the fuselage). The rudder and elevator pushrods are a clean fit through molded cutouts in the aft part of the fuselage.

ASSEMBLY

The first order of business is to put all of your solvent-based adhesives and CA aside because they melt Styrofoam. The only adhesives recommended for assembly are epoxy and white glue; I used epoxy throughout with good results. I recommend that you then clean up the rough edges on the Styrofoam parts with medium-grit sandpaper.

The rudder and fin are molded as one



piece that has a V-groove molded in at the hinge line, and the elevator and stabilizer are made in the same way. The instructions tell you to run a soft, round-point pencil along the top surface of the V-channel hinge line so that the foam will bend along a straight line. When I did this, the control surfaces broke free completely, so I applied clear plastic tape along the top and bottom of the hinge lines. This worked out fine; just remember to hold the control surfaces in their fully deflected position when you apply the tape. After I had glued the elevator joiner into place and installed a leaf hinge in the rear of the fuselage for the rudder, I epoxied the tail feathers to the fuselage.

The fuselage and turtle deck are solid Styrofoam with cutouts for the motor and radio equipment. Other than installing the motor and RC equipment, the only "work"

to be done on the fuselage is to glue on the turtle deck and install the wing-mounting pieces, the landing gear and the tailskid. I found it difficult to identify some of the smaller parts and suggest that you label them with their parts numbers as you identify them using the instructions.

For control, I used the provided Multiplex MS-X2 microsers, a Pico 400 speed control with BEC and a Multiplex Micro IPD receiver. I used the 6V, Permax direct-drive motor that came with the Cub and glued it into place according to the instructions. (A geared motor is available from Multiplex as an optional upgrade.)

I glued two strips of hard balsa together to make the wing spar and then joined the wing panels, adding 12 degrees of dihedral. The wing is attached to the fuselage with two nylon screws that thread into blind nuts. Because the Pico Cub is designed to be a gentle park flyer or an indoor flyer, the wings do not need the additional strength of functional struts. Although the instructions tell how to add struts if you are so inclined, I decided against it, and the wing has held up just fine. The supplied decals really give the Cub a finished look.

CONCLUSION

If you're looking for a change of pace and some really relaxing entertainment, I highly recommend the Multiplex Pico Cub. It is well-made, extremely easy to assemble and looks good in the air. You can't ask for much more than that! ✈

Multiplex USA, 560 Library St., San Fernando, CA 91340; (800) 375-1312; (818) 838-6467; fax (818) 785-3946; www.multiplexrc.com.

FLIGHT PERFORMANCE

• TAKEOFF AND LANDING.

The Pico Cub will take off from a paved area, but because I fly off grass, I decided to hand-launch it. With the motor at full throttle, the Cub needed only a gentle toss to get it going. Once airborne, it climbed nicely without needing any trim adjustments. Landing approaches were fairly long because the Cub has a very shallow glide angle. On the grass field, rollouts weren't possible.

• GENERAL FLIGHT PERFORMANCE.

I experimented with two flight packs: a 6-cell, 1100mAh NiMH pack and a 7-cell, 800mAh Ni-Cd pack. The 7-cell Ni-Cd pack provided considerably more "oomph," but flights were much longer (11 minutes!) with the 6-cell NiMH pack. The Cub handles nicely with coordinated rudder and elevator control. It is a very stable flyer and has good self-righting tendencies. Once or twice, I set the trims so that the Cub flew in large circles all by itself. With a wing loading of less than 9 ounces per square foot, I'm sure that given the right conditions, this plane will thermal. I tried a few

loops and coaxed the Cub into a "sort of" roll, but I didn't want to get too aggressive without having wing struts. I flew it as a Cub should be flown and had a lot of fun doing so.

The Multiplex Pico Cub is a joy to fly, and I found it therapeutic as well. I think I'll use this model to teach my grandsons how to fly!



MODEL AIRPLANE NEWS
FIELD & BENCH
REVIEW



TOP FLITE
P-39
Airacobra





A warbird that flies like a sport model

by Vic Bunze

WHAT'S IN THE BOX

The Top Flite P-39 kit features balsa and ply construction and includes an adjustable engine mount, ABS half-cowl and precision-formed parts for the canopy, air scoop, wing fairings, gun fairings and exhaust ports. The wood is of high quality, and the plan is well drawn and easy to read. You can also add scale realism by including split flaps, retracts and other scale accessories. As is typical for a Top Flite Gold Edition kit, this model is an easy way to get into sport-scale modeling.

CONSTRUCTION

• **Tail feathers.** Construction starts with the stabilizer and fin, which have symmetrical airfoils, and with tabbed ribs that can be built flat over the plan. When I completed the framework, I sheeted the stabilizer and fin with $\frac{1}{16}$ -inch balsa. I followed the instructions and made several bags full of shot to weight down the skins on the framework while the adhesive dried. I built the elevators and rudder

The P-39 Airacobra began as one of the most brilliantly designed interceptor fighters of WW II. It had heavy armament, car-style doors for easy cockpit egress, excellent pilot protection and a supercharged Allison V-1710 engine positioned behind the pilot. The prototype first flew in April 1939 and achieved 390mph at medium altitude—competitive for that time. Unfortunately, mandated changes to better support ground warfare added 2,000 pounds of weight to the Airacobra and doomed it as an all-around combat interceptor. Thousands of Airacobras were sent to the Soviet Union, where they were used with great effectiveness for ground attack and as tank busters. The Soviets loved the nose-mounted 37mm cannon and also equipped the plane with under-wing cannon pods. The P-39 became the “Warthog” of WW II.

by gluing leading edge (LE) stock and rectangular ribs to both sides of a $\frac{3}{32}$ -inch core; when they were dry, I sanded the ribs to a taper. I covered the elevators and rudder later with fabric, as they were on the full-scale P-39.

• **Fuselage.** The fuselage is constructed in halves; you build the top half on the plan, then mount the stabilizer and fin and finally build the bottom half of the fuselage on the top half. While building the top half, I decided to construct a full cockpit interior using the optional Top Flite cockpit kit (I highly recommend it, as it adds a lot to the appeal of the model) and made provisions to add it later. I built the lower half by building the wing-saddle assembly and then adding the rest of the fuselage formers. Next, I added the pushrod guides and the fuselage servos. Engine installation and nose-gear assembly came next; I had decided to add retracts, so I made the necessary modifications to the firewall and to the nosewheel bay. For the retractable nosewheel, I used a Du-Bro pull/pull control

SPECIFICATIONS

Manufacturer: Top Flite

Model: P-39 Airacobra

Type: sport scale

Wingspan: 63 in.

Wing area: 742.8 sq. in.

Weight: 10 lb.

Engine req'd: .61 to .75 2-stroke or .70 to .90 4-stroke

Engine used: SuperTigre .75G

Prop used: APC 12x6

Radio req'd: 4- to 6-channel with 5 to 7 servos (rudder, elevator, ailerons, throttle; optional flaps and retracts)

Radio used: JR 10X

Retracts used: Robart 85-degree main gear (\$72.99); 105-degree nose gear (\$79.99); variable-rate Air Control kit (\$36.99).

Price: \$139.99

Features: fully sheeted balsa and lite-ply construction. Kit includes hinges, adjustable motor mount, preformed landing gear, ABS half-cowl, self-adhesive decals, precision-formed plastic parts and generous hardware package. Retracts and flaps are easily added for scale realism.

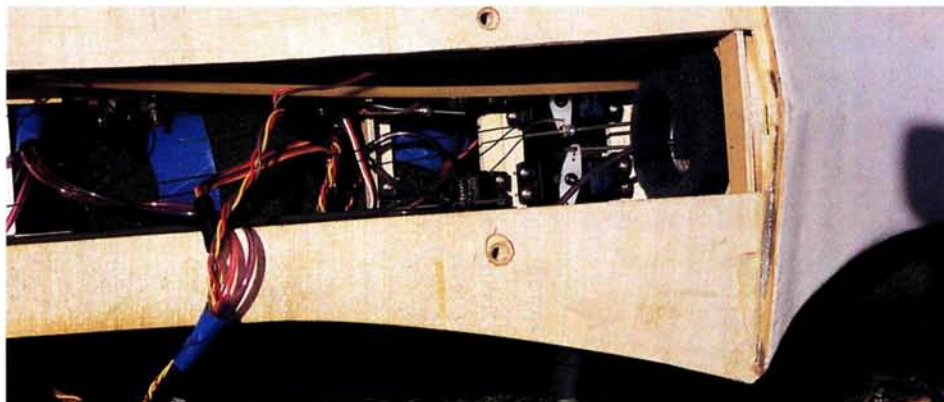
Comments: the Top Flite P-39 Airacobra is a beautifully engineered sport-scale kit for those who want to try their hand at a WW II warbird. In the hands of an experienced builder, it can be made into a potent sport-scale model. The P-39 flies well and has an accurate scale outline. This model makes a great entry into the world of scale warbirds!

Hits

- Complete 47-page manual with photos.
- Complete hardware package.
- Well-designed and lightweight construction.
- Nice vacuum-formed canopy.
- High-quality materials and die-cutting.

Misses

- None.



The radio compartment is compact, but everything fits with no problems. I wrapped the retracts' air tank in foam and mounted it behind the wing.

system. Using the supplied engine mount, I side-mounted the SuperTigre .75G in the nose, added the blocks and shaped them. After I had completed the wing, I added the fuselage longerons and sheeting to achieve the P-39's many contours.

• **Wing.** The wing is the major building part of this project, particularly if you decide to build the split flaps and use retracts. It isn't difficult to build; there are just a lot of steps.

The tapered, semisymmetrical wing is built flat on the plan using a front and rear balsa spar web, which is notched to properly align the ribs. I next added the LE and epoxied the hardwood landing-gear blocks into place.

If you decide to use retracts, you must point the air cylinders in the opposite direction to provide clearance for the 4-inch wheels. When you do this, you'll also need two additional plastic bushings for the retracts, which are available from Robart. To operate the retracts, I used Robart's Air Control kit. It includes the air-fill valve and chuck, T-fittings, variable-control valve, tubing, air tank, quick-disconnects and an onboard pressure gauge, which I mounted in a convenient location.

Because I fly from a grass field, I made the wheel wells slightly oversize to prevent the wheels from getting hung up on them. To accommodate the 4-inch-diameter wheels, the main gear was moved rearward, and I

needed to shorten the main gear struts to increase the wing's angle of attack.

Once the wheel wells were in, I sheeted the bottom of the wing with 1/16-inch sheet balsa back to the rear spar web. I cut openings in the sheeting for the aileron servo bay and added hinge blocks for the ailerons and flaps to the rear balsa spar. I then routed the retracts' air lines and snaked the aileron servo extension through the wing.

I joined the wing halves using the 1/16-inch-ply doublers and plenty of epoxy. I made the ailerons in the same way as the elevators, then I built the flaps on the plan with a 1/32-inch-ply trailing edge (TE) and balsa ribs.

I installed the flap servo and the flap linkage; the flaps should be able to be lowered about 40 degrees. Once the flaps are working, the rest of the wing can be sheeted and the wingtip balsa blocks added and sanded to shape.

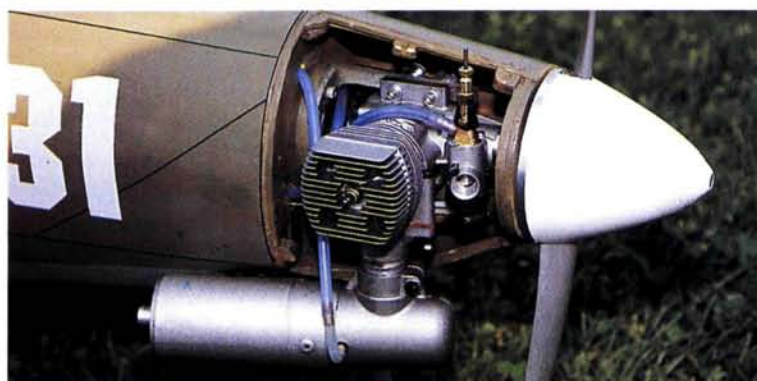
The wing is now ready to be trial-fit to the fuselage and for final alignment to the wing saddle. When I had everything lined up, I fitted the 1/4x3-inch wing dowels into the fuselage. I decided to reinforce the former in the fuselage that accepts the wing LE dowels; there isn't much wood in that area.

COCKPIT INTERIOR AND PILOT

This is the fun part of any scale project. The Airacobra has a large canopy, so you can build in a lot of detail. I used Top Flite's P-39 Airacobra scale cockpit kit and 1/2-scale pilot and then sprayed the cockpit interior parts with Testors Model Master interior green, detailed the instrument panel and added a realistic harness to the pilot figure. I also added other bits of "eye candy" to the front and side panels to busy up the cockpit, and I added a radio to the compartment behind the pilot.

FINISHING

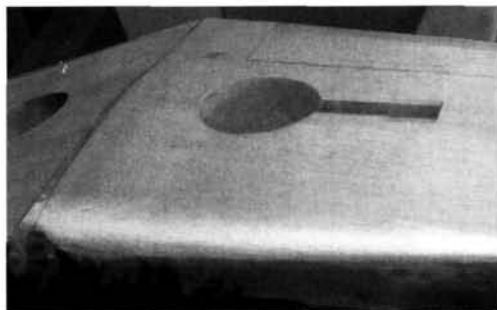
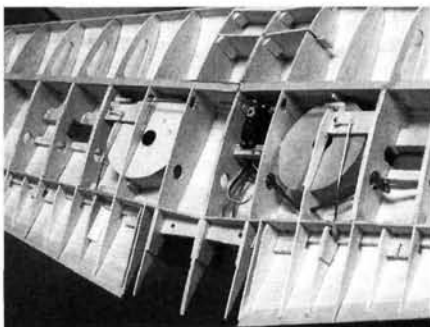
Except for the rudder, elevators and ailerons, I covered the plane with 3/4-ounce



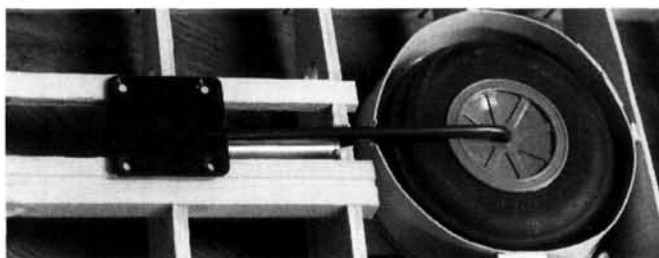
The business end of the P-39. With the half-cowl removed, you can see that there's plenty of room for the SuperTigre .75G.

P-39 AIRACOBRA

Right: here the wing is ready for the top sheeting. The flaps and the retracts have been installed and checked for proper operation. Below: I fiberglassed the entire airframe with 3/4-ounce cloth. Here, the bottom of the wing awaits the application of epoxy resin.



I used Robart retracts and had to change the direction of the air cylinder for the 4-inch-diameter wheels. Note the oversize wheel for grass-field operations.



fiberglass cloth from Aerospace Composite Products and used West System epoxy. When the fiberglass had cured, I sanded the airframe with 80-grit wet sandpaper and then used wet 160-grit. I airbrushed the Airacobra's color scheme using Chevron Perfect Paint for the primer, then I added olive drab, gray and semi-flat clear. For the tan areas, I used Top Flite LustreKote paint.

All the paints gave excellent coverage and resulted in a realistic finish. I applied the supplied insignia markings and numerals and made panel outlines by using 3/4-inch-wide artists' graphics tape; I sealed them with flat clear overcoat.

RADIO INSTALLATION AND SETUP

I used a combination of Hitec, Airtronics and Futaba servos: three in the wing for the flaps and ailerons and four in the fuselage for the elevator, rudder, throttle and retracts. The nosewheel is steered from the rudder servo and uses a Du-Bro pull/pull control system, and I positioned

the retract air tank behind the canopy area. I set up the flaps on a 3-position switch: fully retracted, half and fully deployed. I experimented with coupling some down-elevator trim to the flaps when deployed and found this was not necessary during flight-testing.

CONCLUSION

The Top Flite P-39 Airacobra is an easy-to-build and fly, sport-scale warbird that allows you to add as much scale detail as desired. The P-39 lands well and is capable of any maneuver that a scale plane would perform. It draws a lot of attention at the field and is not as common a subject as the more popular Mustangs and Spitfires, but it can rival them for detail and flight performance. ✦

Aerospace Composite Products, 14210 Doolittle Dr., San Leandro, CA 94577; www.acp-composites.com.

Airtronics, 1185 Stanford Ct., Anaheim, CA 92805; (714) 978-1895; fax (714) 978-1540; www.airtronics.net.

APC, distributed by Landing Products, 1222 Harter Ave., Woodland, CA 95776; (530) 661-0399; fax (530) 666-6661; www.apcprop.com.

Du-Bro Products, P.O. Box 815, Wauconda, IL 60084; (800) 848-9411; fax (847) 526-1604; www.dubro.com.

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Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008; www.greatplanes.com.

Hitec RCD Inc., Glenn Merritt, 12115 Paine St., Poway, CA 92064; (858) 748-6948; fax (858) 748-1767; www.hitecrd.com.

JR, distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.

Robart Mfg., P.O. Box 1247, 625 N. 12th St., St. Charles, IL 60174; (630) 584-7616; fax (630) 584-3712; www.robart.com.

SuperTigre, distributed by Great Planes.

The Testors Corp., 620 Buckbee St., Rockford, IL 61104; (815) 962-6654; fax (815) 962-7401; toll-free in U.S. and Canada (800) TESTORS; www.testors.com.

Top Flite, distributed by Great Planes.

West System, distributed by Composite Structures Technology, P.O. Box 642, Tehachapi, CA 93581-0642; (805) 822-4162; fax (805) 822-4162.

FLIGHT PERFORMANCE

Before the first flight, I balanced the P-39 as recommended and ran a few tanks of fuel through the SuperTigre .75G, which ran flawlessly.

• TAKEOFF AND LANDING

I advanced the throttle and allowed the P-39 to accelerate on the grass runway. I held some extra up-elevator for rotation (remember the aft main gear), and after 150 feet, the P-39 lifted off. Ground tracking was excellent. The plane climbed out eagerly and only required minor trim adjustment. Once trimmed, the P-39 flew with authority. Landings are very easy. Its generous wing area and semi-symmetrical airfoil allow the P-39 to slow to an easy pace for touch-down, with or without flaps. The model has no bad habits and does not require high-speed approaches.

• LOW-SPEED PERFORMANCE

The P-39 lives up to its reputation as a stable flying platform. I found that it maneuvered well at low speeds and had no tendency to snap or lose control effectiveness. Using flaps slows the P-39

even more, and a steeper approach and more throttle during landing is recommended when using flaps.

• HIGH-SPEED PERFORMANCE

The P-39 is spirited at full throttle; it's quite groovy and maintains smooth control response. No trim changes are required, and the plane is easily pulled through tight turns with no high-speed stall tendencies.

• AEROBATICS

The Airacobra is capable of anything its full-size counterpart can do and then some. It has good vertical, but not unlimited. It performs loops, stall turns, split-S's and rolls with ease. Inverted flight requires using appropriate down-elevator. I have not yet had a chance to do more aggressive maneuvers such as snaps, spins and outside loops. For a scale warbird, the P-39 Airacobra is a lot of fun to fly.



MRC/ALTECH HIROBO

SST EAGLE *Freya*

PHOTOS BY WALTER SIDAS, PETER HALL & RICK BELL



The tail rotor is very robust; it uses two radial bearings and a thrust bearing in each tail-blade grip. This and the dual-point pivot make the tail-rotor response tight and positive.



SPECIFICATIONS

Model: SST Eagle Freya
Type: aerobatic helicopter
Manufacturer: Hirobo
Distributor: MRC/Altech Marketing
Main rotor diameter: 1,533mm
Length: 1,375mm
Radio used: Futaba 9Z with 5 servos
Engine used: O.S. .61 SX-WC
Fuel used: Morgan 30-percent nitro
Price: \$700

Features: FFZ-II rotor head that allows control response tuning from novice to expert settings; stacked frame chassis; bearings on all pivot points; split gear for driven tail rotor during autorotations; belt-driven tail rotor for low maintenance; prefinished main blades; sleek canopy design.

Comments: the Hirobo SST Eagle Freya is a great performing helicopter. It's easy to build, easy to maintain and has rock-solid flight characteristics for novices and experts alike. No upgrades are required for 3D aerobatics, and the kit-supplied blades work very well.

Hits

- Easy to build, with good setup instructions.
- Full complement of bearings.
- Solid flight performance.

Misses

- Nuts and bolts are not sorted.
- Receiver switch is difficult to access.

Newest sibling in the Eagle family

by Rick Bell

One look at the SST Eagle Freya, and you can see that it originates from the Hirobo SST Eagle 2 Ex and Eagle WC that Manabu Hashimoto flew in 1997 and 1999 to win the F3C World Championship. With the Freya, Hirobo engineers have taken a proven design and refined it for the 3D pilot. Don't be mistaken; this heli can be a serious contender in AMA and FAI competition.

To keep the price down, Hirobo uses high-impact-engineering plastic main frames that absorb vibration. The Freya's innovative features include:

- the newly designed FFZ-II rotor head that allows different Bell-Hiller ratios.
- the flybar paddles have removable endcaps to allow quick and easy weight adjustment.
- the new split-gear constant tail-drive system drives the tail rotor during autorotations.

- the tail-rotor servo is mounted on the tail boom for a direct linkage hookup to the tail rotor.
- the tail-rotor pitch mechanism is supported by dual pivot points for a very tight tail-rotor control system.
- the tail fins are of a skeleton design for aggressive 3D flying.
- the sleek and narrow canopy allows fast forward and backward flight.
- all pivot points use ball bearings, not bushings.

ASSEMBLY NOTES

Before you begin assembly, it's always a good idea to pull out the manual and read it from cover to cover. The manual starts off with safety warnings, items needed to complete the model and other information. It has little in the way of written notes, but it's very well detailed and easy to follow. I started by removing all of the numbered parts bags from the kit and laying them out in assembly sequence. All of the hardware (screws, nuts, etc.) is in separate bags and must be sorted. Be sure to degrease all the screws and use Loctite on all metal-to-metal fasteners. In this article, I'll cover the assembly steps that need special attention or are not so obvious in the construction manual. The molding of the parts throughout the kit was outstanding, and the fits were very precise!

FLIGHT PERFORMANCE



• HOVERING

First hovering flights were non-events. I used a sweet-running O.S. .61 SX-WC that had been run on nothing but Morgan 30-percent fuel. As I mentioned earlier, the Freya comes with 660mm blades that I thought were a little small (680mm is the standard for a .60-size heli). But after the first liftoff, the Freya sat in a nice, firm hover. No trim adjustments were required, the cyclic and collective responses were solid without being twitchy, and the Freya was very smooth. I checked the tail-rotor response—precise and predictable. I could tell this was going to be a great flying heli.

• FORWARD FLIGHT

After I had run through a few tanks of fuel while hovering, I moved on to forward flight. Using the recommended setup figures resulted

in a main rotor-head speed of around 1600rpm on idle-up—good for mild aerobatics. After flying a few circuits and getting a feel for the control responses, I was ready to turn the Freya loose.

• AEROBATICS AND 3D

Using the kit blades, standard maneuvers such as loops, rolls and 540 stall turns were easy. The controls were well balanced, and the stock main-rotor and tail blades worked very well. Mild 3D maneuvers were also possible. The stock 660mm blades did autorotations well; they were solid with good wind-up. For aerobatic comparison, I bolted on a set of 680mm main blades, and the Freya really came to life. It easily handled flips, tumbles, sideways loops, backwards loops and rolls.

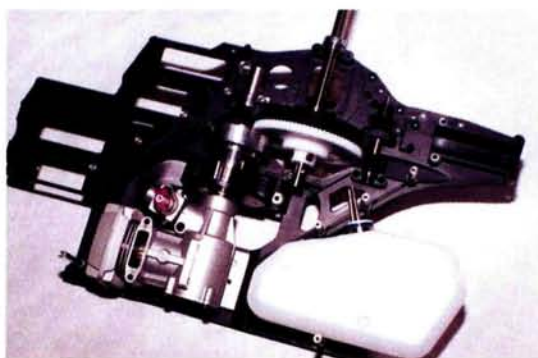


The tail-rotor servo is mounted on the tail boom and uses a 5mm-diameter aluminum pushrod.

autorotation unit (which is pre-assembled to the split gear), be careful not to overtighten the screws, or you could distort the unit.

The swashplate is made of a combination of molded plastic for the outer ring and metal for the inner ring. I used a 3mm bolt

• **Elevator lever assembly.** I first screwed the ball-link ends to the A-arms because after the A-arms have been attached to the elevator lever, it's difficult to reach the screws that hold the ball links in place. I followed the diagram for the rest of the assembly with no problems.



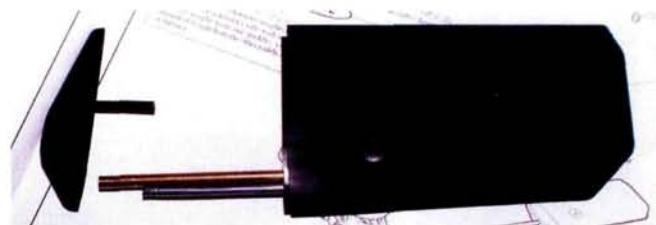
• **Upper frames.** The frames have molded pockets for the bearings and cross-members. Before screwing the frame halves together, be sure the elevator lever assembly is oriented correctly between the frames; there is a left and a right side. Now is a good time to add the receiver switch (it's difficult to add later). I also used a tiny drop of epoxy to secure the outer race of the bearings in the pockets to prevent them from rotating. Again, the fits were very good and the frames were perfectly aligned.

• **Fuel tank.** Be sure the clunk does not hit

the back of the tank, or you could have fuel starvation problems later. Also attach the fuel-feed and muffler-pressure lines from the tank now; they will be difficult to access when the tank is mounted in the chassis.

• **Lower frames.** The lower frames are now screwed to the upper frames, capturing the fuel tank between them. The tank is supported by six rubber cushions that fit into recesses in the tank. I used a tiny drop of thin CA to secure them to the frames to prevent them from falling out before the tank was in place.

• **Main gear and swashplate assembly.** When you screw the main gear to the



Above: the flybar paddles have removable endcaps to allow access to the removable weights so the control response can be fine-tuned. Left: the inner workings of the Freya; notice the split-gear main gear that drives the tail rotor during autorotations.

to start the threads for the balls on the outer ring. Also make sure that the two longer balls oppose each other on the inner ring.

• **Rotor head.** The feathering spindle is supported by two metal holders that must be glued into the yoke. I used slow-setting epoxy on the holders and used the spindle to align the holders while the epoxy set. The spindle should slide smoothly in the spindle holders. The seesaw assembly gives you options for the flying performance you desire: high stability (novice), standard (intermediate), or high aerobatics (aggressive 3D). I followed the instructions for the standard settings with no problems. Be cer-

FREYA PERFORMANCE MODS

Want to improve performance or individualize your Freya? Hirobo has several upgrades available to enhance the performance and looks of your heli.

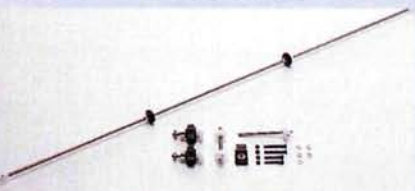
This machined Delrin gear will provide smoother power to the tail rotor, making for a smoother heli. **\$99**



The CCPM (cyclic collective pitch mixing) Control Conversion Set is also available to convert from mechanical mixing to 120-degree CCPM. The set includes metal, dual ball-bearing control arms, swashplate and all linkages, and it's easily fitted. **\$350**



The optional Freya WC and Logo Decal set is a quick, easy way to enhance the look of your Freya. Choose either set, or mix and match them to make your heli stand out from the crowd. **\$39**



If you're into aerobatic autorotations, you need all the rotor-head energy you can get. This torque-tube set will do just that. Made of stainless steel and supported by dual ball bearings for minimal drag, it replaces the belt drive and frees up power from the tail drive. **\$250**

tain to grease the thrust bearings and install them correctly. I followed the manual for the rest of the rotor-head assembly and then balanced it on a High Point balancer.

• **Tail rotor/tail boom.** The tail rotor is easy to assemble: be sure to capture the drive belt between the case halves before you screw them together. Just as with the main rotor, be sure to grease the thrust bearings and install them correctly. Before installing the tail rotor on the output shaft, I balanced the assembly on a High Point balancer—a must for smooth operation. I installed the tail-rotor pushrod guides and the tail-rotor servo mount on the tail boom before installing the boom on the chassis. Make certain the drive belt has the proper twist in it, or the tail rotor will spin backward.

• **Engine assembly.** This is easy; just be sure to balance the fan assembly, the clutch and the bell housing. The fan uses a tapered collet to center the fan, and it's always a good idea to check the runout with a dial indicator. If you are using an O.S. .61 SX-WC, you will need to remove the carburetor so the engine can be slid between the frames from the bottom. There are six flanged washers that sit in between the engine mounts and the frames that can be difficult to install as you are trying to slide the engine into place. I used some petroleum jelly to hold the washers in place.

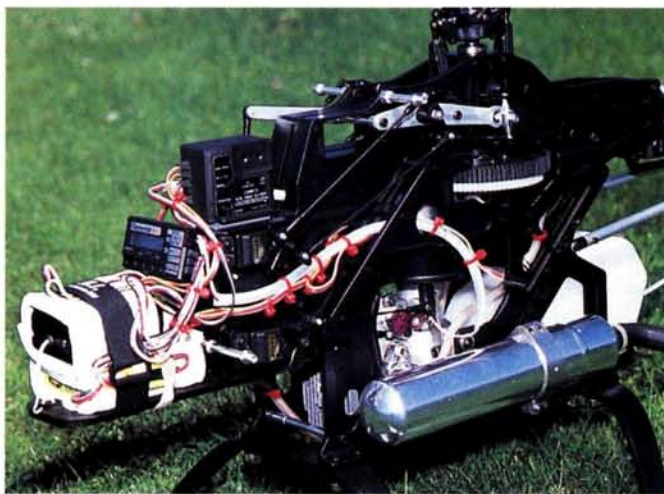
RADIO INSTALLATION

Radio installation is very straightforward. I followed the manual and only encountered a problem with the receiver switch. There isn't much room in the frames to mount it where it belongs; that's why I mounted it when I built the frames. When you mount the tail-rotor servo on the tail boom, be certain the servo lead is tucked out of the way and can't get caught in anything. I also installed the gyro, receiver and battery where indicated. The most tedious assembly job with any helicopter is to screw the ball links onto the pushrods. To make the job easier, I mounted a ball-link tool in a cordless drill and completed the task quickly. The manual is very clear about which pushrod goes where and the direction that each servo moves. One nice feature of the Freya is its aluminum tail-rotor pushrod, which makes for a very tight tail system. It was a good move on Hirobo's part to include main rotor blades with the kit. I thought the blades looked a little small, so I measured them and found they are 660mm

long. They come finished, and you need only glue the root reinforcements to them and balance them. Once this has been done, you can use the graphs in the manual to set up the pitch and throttle curves. Now trim and assemble the canopy, decal the model and do a final check of all components. The model is complete and ready for flight.

FINAL THOUGHTS

The Hirobo Freya is a very high-quality, moderately priced .60-size helicopter. It is easy and quick to build. I had no problems with any parts fit. Although the manual could use a few more written notes, the exploded illustrations and full-size drawings of the small parts for each step do help make assembly easy. Flight performance is outstanding—worthy of its champion lineage. Several gallons of fuel have been run through it, and the heli shows no signs of wear; I've only had to keep it clean. All in all, the Freya is a very good helicopter for the novice or expert and will give you many years of service. Give one a try! ✈



Neat wiring is a must for problem-free operation. Notice the foam-wrapped receiver and battery.

Futaba Corp. of America; distributed by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826; (800) 682-8948; www.futaba-rc.com.

High Point; distributed by Robart Mfg., P.O. Box 1247, 625 N. 12th St., St. Charles, IL 60174; (630) 584-7616; fax (630) 584-3712; www.robart.com.
Hirobo; distributed by MRC/Altech Marketing, 80 Newfield Ave., Edison, NJ 08818-6312; (732) 225-6360; fax (732) 225-2100; www.modelrectifier.com.

Loctite, 18731 Cranwood Ct., Cleveland, OH 44128; (216) 475-3600.

Morgan Fuels; a division of Morgan Inc., P.O. Box 1201, Enterprise, AL 36331; (205) 347-3525; fax (205) 393-4852.

O.S.; distributed by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008; www.greatplanes.com.

Zlín Z-526 AS

20-percent precision-scale aerobat



by Dick van Mourik



The cockpit is fully detailed and shows the same attention to detail as the exterior of the model.

I have always been fascinated by airplanes. Of course, the fact that my father built and flew model aircraft contributed to this fascination. A book that my father owned, "Great Planes" by James Gilbert, included a photograph of two Zlín Z-526s flying in close mirror formation. From the first moment I saw this picture, I was captivated, and this

older type of Zlín still ranks among my most favorite aircraft.

In 1993, I found the address of the Otrokovice Zlín factory in the Czech Republic. I wrote to the company and acquired a very detailed drawing and many pictures of the 526 types. I decided to construct the 526 AS and made several visits to the factory for valuable scale documentation.



SPECIFICATIONS

Name: Zlin 526 AS

Scale: 1:5

Wingspan: 83 in.

Length: 63 in.

Weight: 12.9 lb.

Wing area: 964.87 sq. in.

Wing loading: 30.8 oz./sq. ft.

Wing airfoil: semisymmetrical at root, under-cambered at tip

Engine: Laser 1.20 4-stroke with custom-made silencer

Radio req'd: 6-channel (elevator, rudder, tailwheel, throttle, ailerons, retracts)

Comments: designed by Dick van Mourik, the Zlin 526 AS is a 20-percent, precision-scale aerobatic model. The model uses traditional balsa and plywood construction; the plan is highly detailed and shows scale, homemade retractable landing gear.

FLYING

I'm convinced that a successful first flight depends on good preparation. Check all vital points, such as engine-mounting screws and RC gear. Check the alignment of wings and tail surfaces, check the wing and tail incidence and double-check the center of gravity (CG) balance point.

Normally, I spend an afternoon just setting up an engine until it runs exactly the way I want. I also do numerous taxi trials to get the feel of the model, and I make

some short hops close to the ground. This way, you get a good idea of how the model will behave. The actual test flight is then just a matter of fueling up, starting the engine and taking off.

In all honesty, the actual first flight was a bit of a non-event. With the engine revving fully, the model just roared into the sky. It went up easily, with no noticeable elevator trim required. The Zlin has pleasant aerobatic capabilities, although knife-edge takeoffs are not in this model's flight envelope.

The large amount of washout allows very slow flight, without the risk of tip-stalling. All maneuvers are executed very scale-like at about $\frac{1}{3}$ throttle, and with the gear up, the model looks very graceful, despite its somewhat clumsy appearance on the ground. Retracting the landing gear brings a major CG change; it produces a nose-up pitch change. Putting the wheels down causes a slight nose drop (which is useful when landing). The position of the balance point proved to be not too critical, so I currently fly the model balanced (landing gear retracted) at 28-percent of the mean aerodynamic chord (MAC). This makes it quite responsive during flight and nice and steady during takeoff and landing.

Takeoff runs require about 3 yards, but this is, of course, not very scale-like. Landings are very easy; just close the throttle, and it will come in slow and easy. The model is a real floater and so requires a fairly flat landing circuit. It is capable of doing more maneuvers than I am. It is not a hot pattern ship; it has to be flown smoothly through all the figures. Personally, I find those big loops are really worth watching, but a low flyby with the model banking slightly is also a sight to behold! Because of the high aspect ratio wings, the model looks very graceful when being put through its paces, a sight enhanced by the arrow-like patterns on the wing.

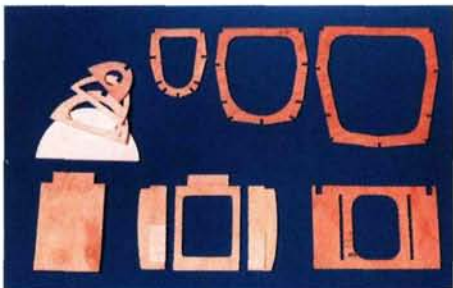




This close-up shows the static scale prop and the scale spinner to good advantage.

CONSTRUCTION

The fuselage cross-sections are very tapered toward the bottom, which doesn't allow the fuselage to be made with the common fuselage box structure using half formers. I decided to split the fuselage structure



The fuselage formers have a fully conventional layout. These are about the only ply parts in the entire model.

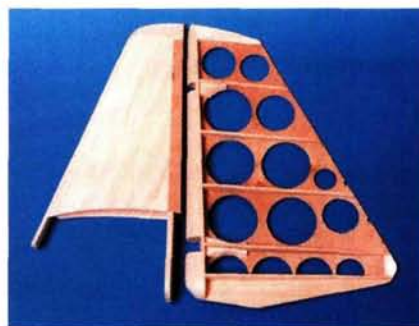
lengthwise along the bottom of the canopy line, which enabled the whole thing to be built inverted. The basic structure is nothing more than a plywood box in which the tank, radio and the beechwood engine rails all fit. You could use commercial mounts, but you might have trouble mounting them, as the engine thrust line is very high and the nose is narrow.

The rest of the fuselage is then built around the main structure the old-fashioned way—with formers and stringers added, followed by strip planking.

The vertical fin and horizontal stabilizer are constructed with $\frac{3}{32}$ -inch ribs and sheeted with $\frac{1}{16}$ -inch balsa. The rudder and elevators are built around $\frac{1}{16}$ -inch balsa core sheets with $\frac{1}{8}$ -inch balsa half ribs glued to each side. Plywood cores are shown on the pictures but I have since changed them to balsa because the thin plywood trailing edges (TEs) tended to warp.

• **Wings.** The Zlin's wing section is a bit odd! It changes from a thick, nearly symmetrical section at the root to a fully under-cambered section at the tip. Additionally, it has a generous 6 degrees of washout. The root incidence of 4.5 degrees makes things even more interesting, although it doesn't cause much trouble during construction. The wings must be built on a simple jig to ensure the correct amount of washout. See the detailed section sketch on page 1 of the plan.

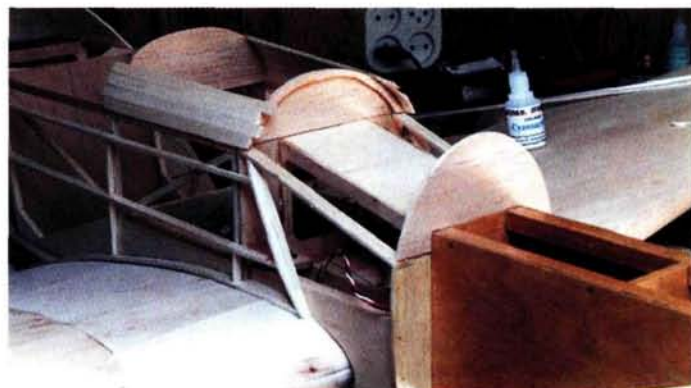
The AS version of the Z-526 has no flaps, which eliminates the need for a third longeron and also saves weight. The large amount of washout requires the longerons to be built up in two layers, which is also shown



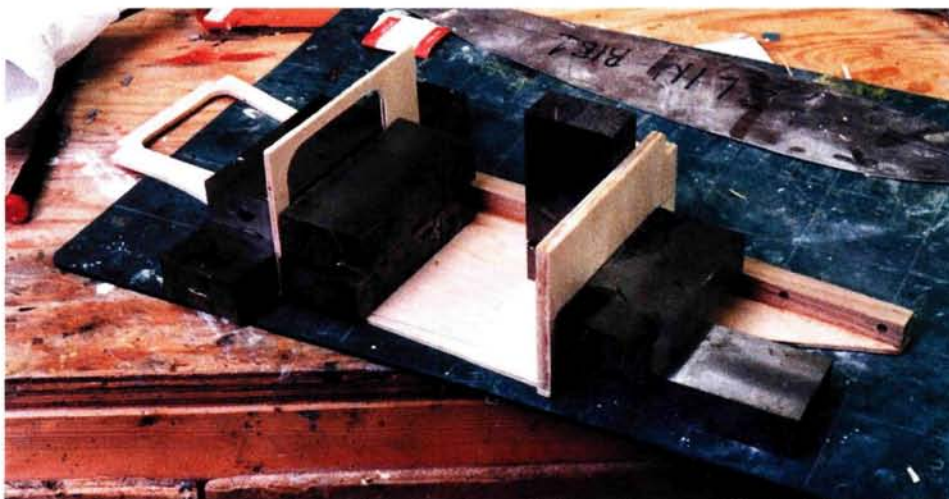
Left: vertical fin and rudder; the hinge post is later glued onto the fuselage. On the plan, I changed the $\frac{1}{64}$ -inch plywood core sheet to $\frac{1}{16}$ -inch balsa.



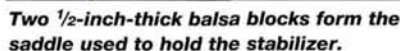
Below: the stabilizer and elevator are shown here; note the $\frac{1}{64}$ -inch plywood insert on the stabilizer trailing edge; it forms a thin rim that the elevator leading edge fits into.



All the sheeting on the prototype model was made with $\frac{3}{32} \times \frac{3}{8}$ -inch balsa planks to eliminate structural stress.



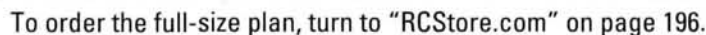
The basic fuselage is formed around the two plywood plates. Here, steel blocks help to align the bulkheads while the glue sets.



- **Detailing.** The cockpit interior is a real standout and was made using commonly employed materials such as scrap balsa, plastic stock and hard foam. The lever knobs were taken from a plastic pearl necklace. Perhaps the most vital point to remember when creating an interior is to do a proper painting job; it will really bring things to life. You'll also want to carefully mask the inside surface of the canopy, add some framing and spray the whole thing in gray or light green. Nothing kills the look of a cockpit interior more than being able to see the glue that was used to attach the framing.

Another eye-catching item on Zlín aircraft is the Cessna-like aileron stiffeners, which I made from plastic strips from a Goldberg Cessna kit. This material is very easy to use; the only snag is that you'll have to order a hundred lengths at a time.

The fuel indicators in the wing were made from pieces of different colored plastic card, covered by a small transparent blister cover.



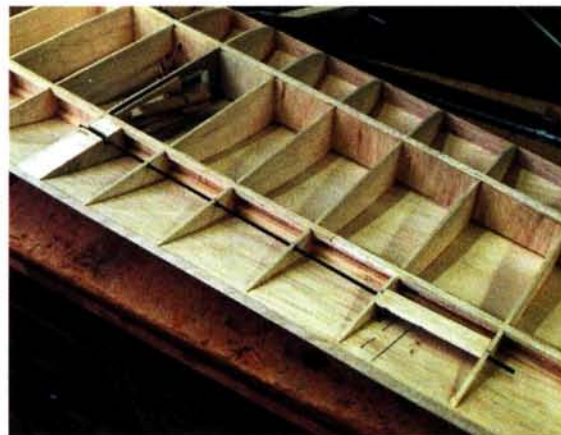
CONSTRUCTION: ZLIN Z-526 AS



Above: here, the wing center section shows the main plywood ribs and landing gear attachment blocks.



At the wing TE, the fuselage stringers are cut and bent in to follow the contour of the fuselage.



Below: the uncovered model reveals its structure. Note the weight-saving open fuselage construction.

Once the center section is completed, the outer panels are added. Because of the excessive washout, the spars are placed on supporting blocks.



• **Covering and finishing.** The wing is covered in thin glass cloth and epoxy resin. To avoid the use of primer, I applied the cloth with white pigmented epoxy resin. The fabric-covered part of the fuselage was finished with Polytex, which is available from Nelson Hobby Specialties and really is tremendous stuff. The rear turtle deck was covered with tissue and dope, which still is one of the finest methods for finishing a scale model. I painted the model with Hobby Pox, mixed in the appropriate colors.



The detailing on the landing gear legs is sure to attract attention. It takes some time, but it is well worth the effort. Keep the wheels as light as possible to avoid large shifts in the balance point position when the gear is retracted.

• **Engine and radio.** The model uses 6 servos: three in the wing (left and right aileron and retract valve) and another three in the fuselage (elevator, rudder and throttle). I also installed two parallel 1000mAh battery packs. This does not work as a battery back-up system, but in case of a bad switch or connection, it does provide extra safety.

If you use a large 4-stroke engine, as I did, it will help to move all your electronics and radio gear as far aft as possible. Because



Left: one air cylinder drives both legs simultaneously. Full details of the landing gear are shown on the plan.

CONCLUSION

This model certainly stands out in a crowd, and it looks very impressive in flight. Have a go at this Czech masterpiece; you

of the fully detailed cockpit interior, I installed the servos just in front of the balance point, with the radio switches just behind a luggage hatch behind the cockpit. I placed the battery packs at the far rear of the fuselage (accessible through a hatch). Despite all this, the proto-

type model still needed about 5 ounces of tail ballast.

I powered the model with a Laser 1.20 because I've had good experience with these engines. For those of you who fancy really hot flying, a 1.50 could be used. A Zlin is by no means a fast machine; a good 1.00 or even an .80 4-stroke would be more than adequate for power. The slim cowl allows little room for the silencer, but after several experiments, I installed a custom-built German Zimmermann silencer behind the engine.

won't be disappointed! ✚

Editor's note: the author offers a complete package, including fiberglass engine cowl, spinner, belly pan and a molded clear plastic canopy for his Zlin 526. For more information, contact: Dick van Mourik, Weth. Mooringstraat 2, 5301 NT Zaltbommel, Netherlands; d.j.van.mourik@freeler.nl.

Balsa USA, P.O. Box 164, Marinette, WI 54143; (906) 863-6421; fax (906) 863-5878; www.balsausa.com.

Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, IL 60651; (773) 626-9550; fax (773) 626-9566; www.goldbergmodels.com.

Hobby Pox, 36 Pine St., Rockaway, NJ 07866; (973) 625-3100; fax (973) 625-8303.

Nelson Hobby Specialties, 394 S.W. 211th Ave., Aloha, OR 97006; toll-free (877) 263-5766; (503) 259-8899; www.nelsonhobby.com.

Polytex; distributed by Balsa USA.

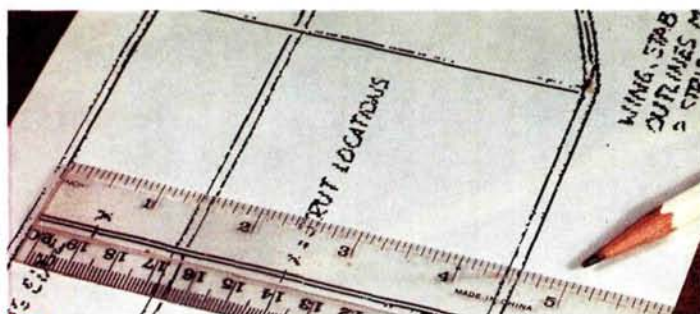
Robart Mfg., P.O. Box 1247, 625 N. 12th St., St. Charles, IL 60174; (630) 584-7616; fax (630) 584-3712; www.robart.com.

Build a rib jig

Quick fix for perfect ribs

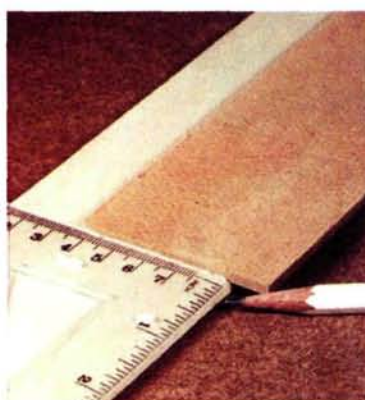
by Randy Randolph

Sliced ribs, which are perfect for single-surface and tapered wings, are the scratch-builder's answer to laser-cut ribs! They can quickly be cut out, and one size fits all. If you're building a constant-chord wing, they are complete as sliced; to build a tapered wing, simply trim the leading or trailing edges to fit. Because the spars must be tapered to fit between the bottom strip and the rib at each station in a tapered double-surface wing, the depth of the sliced rib is important. The photos show how to easily and quickly produce sliced ribs of uniform depth.

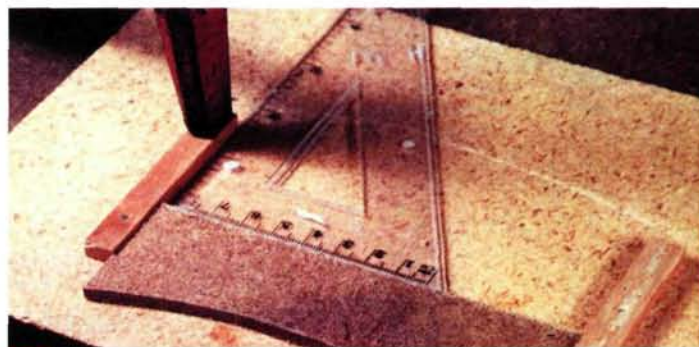


1 The first step is to measure the length of the longest rib in the wing. In this case, the ribs are for a small, 3-channel, indoor RC model. This wing will have a single spar, but you can cut ribs for a multi-spar wing in exactly the same way.

Mark the rib length on a hard board; Masonite works well. This piece will be the ram in the rib-slicing jig, so it is important that all of its edges are square.



3 Use the ram as a template to cut a piece of balsa sheet that's the same length as the rib, with its wood grain running the length of the rib. The longer the rib, the thicker the balsa sheet needs to be; 1/16-inch-thick wood is good for up to 6-inch-long ribs that have a single spar and up to 8-inch ribs that have multiple spars.



4 Tack two, 1/4x1/2-inch strips of hardwood or balsa on each side of the ram for a slop-free fit. The tops of these strips must be parallel to the top of the ram.



5 Trace the contour of the rib on a piece of hard board that is the same width as the outside edges of the strips you just tacked into place on the jig; then saw out the rib template. This will be held tightly against the tops of the strips and even with the two sides as you slice the ribs.

Select a strip of wood that's as thick as the desired rib will be deep; in this case, 1/8 inch thick. Hold the rib template in place on top of the jig rails, place the strip above the template and use it as a spacer to tack a third hardwood strip parallel to the top of the jig rails. The jig is now complete.



7 Place the pre-cut sheet balsa into the jig and slide it against the stop. Place the template on the top of the rails and use it as a guide to slice the top of the first rib. Hold the razor knife as close to vertical as you can. Remove the slice, and use the ram to push the balsa sheet up against the stop; hold the template in place and slice the rib. Slice the rest of the ribs the same way, and all will have the same dimensions. Enjoy! ✈

Apply a Stits Lite finish

by Bob Benjamin

Today's model airplane builders have a vast assortment of high-tech products to choose from when planning a new project. From the most sophisticated computer radio to the smallest bottle of glue, RC modeling truly is a space-age activity that involves many products derived from full-scale aviation. This is especially true of covering and painting materials. Using these products requires patience, but the finished projects are well worth the effort.

Having tried nearly every covering product on the market, I now prefer to use the Scale Stits system from F&M Enterprises for all but my very smallest and lightest models. Stits covering was developed exclusively for model airplane use by F&M's Chip Mull, and it's available in weights and quantities that are appropriate for models. With some minor modifications, the tech-

niques used to apply Stits covering will work with any of today's other popular model fabric and paint products. The model featured in this article is my Dynaflyte 1/4-scale Fly Baby.

■ **Preparation.** Regardless of which product you use, your *real* first step toward a good covering job is to prepare the model's structure by sanding smooth every part that will come into contact with fabric. For this, I use a sanding block and increasingly fine sandpaper grits until everything is satin smooth. I follow this with a wood sealing product that's compatible with my chosen finish. I use two coats of clear, non-shrinking nitrate dope; when dry, it's very easy to sand, and it accepts Stits products nicely. Stits Poly Brush primer will work well also. The idea is both to seal the bare wood against moisture and to improve the fabric's adhesion. When all of that has been done, cut your fabric pieces just a bit larger than each structure to be covered.

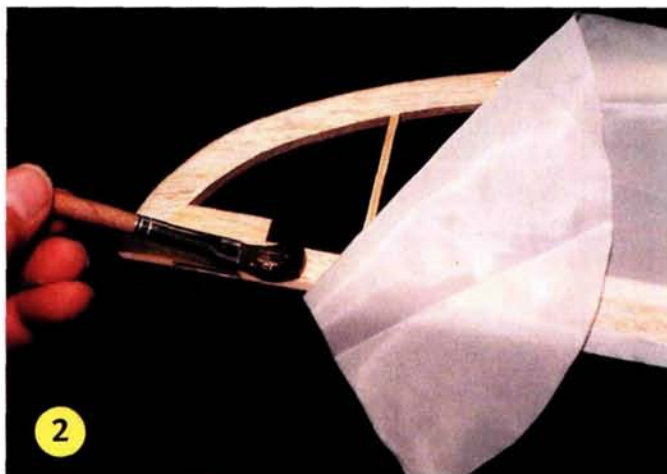
With the fabric in position on the structure to be covered, fold back a section and apply Poly Tak adhesive along 6 to 8 inches of the structure's outer edge. Using your thumb and fingers, press the Stits fabric firmly into place, letting the adhesive penetrate the weave. After a moment, the adhesive will hold the fabric tight. Work around the perimeter of the structure, and wrap the extra fabric over its edge to the other side. Pull it and press it to smooth out all but the smallest wrinkles; they will be eliminated with heat later.

Having covered one side of the surface, repeat the process for the

*An easy-to-apply,
scale covering material*



1 Begin by cutting the Stits fabric slightly larger all around the part to be covered. Use a pair of sharp scissors.



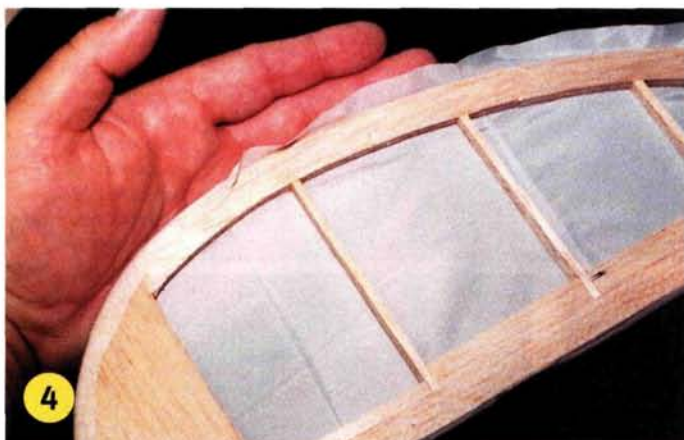
2 Work on short sections of the structure at a time, and apply the Poly Tak adhesive with a small brush—only around the edges and not to the ribs.



3 Press the fabric into the glue, and work it into the fabric's weave with your fingers.



Me and my Dynaflyte 1/4-scale Fly Baby; the model is finished with the Stits Lite covering system from F&M Enterprises.



4 Wrap the fabric around the edges and secure it with more adhesive. Try to work out all the wrinkles.



5 Having covered the first side, repeat the process to cover the other side. After the adhesive has dried, heat the fabric with a covering iron to shrink out any wrinkles and tighten it. Use only as much heat as it takes to tighten the fabric; do not over-shrink it, or you may distort the structure.



6 Once the fabric is tightly secured, apply a coat of Poly Brush fabric primer and let it dry. It is fairly thin and soaks into the fabric weave; it also bonds the fabric to the underlying structure. That's why you apply Poly Tak only to the outer edges.



7 Stits Lite is easy to form around curves and is excellent for wingtips and other difficult-to-cover areas. Note that the fabric has been glued down around the wingtip edge.



8 Where the fabric overlaps, the joint must be bonded into place with Poly Tak adhesive. Use a small brush and press the fabric into place with your fingers, working out as many wrinkles as you can.

other side. You must seal the second overlap down over the first layer with more Poly Tak adhesive. Use finger pressure to smooth down the overlapping layer. This bond will never slip, and the double layer of fabric will reinforce the structure's edges.

■ **Heat shrinking.** You may damage the fabric if you overheat it, so don't use a heat gun; instead, use a covering iron set to the temperature suggested in F&M's Stits instructions. I use a calibrated 21st Century covering iron from Great Planes set at 225 to 250 degrees Fahrenheit. I lightly touch the fabric with the iron to smooth out small wrinkles and to seal down any loose areas around the structure's perimeter. Poly Tak adhesive is heat-activated, so heating helps to bond the fabric to the structure.

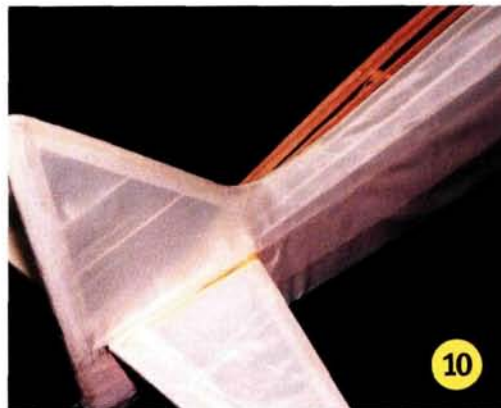
The instructions recommend that you shrink the fabric in several stages, increasing the temperature by 25 degrees at a time. This ensures uniform shrinkage, and it doesn't tighten the fabric so much that you damage the structure. For stubborn wrinkles, you can increase the heat to up to 350 degrees for more shrinkage, but do this only where absolutely necessary. The Stits fabric is extremely stable and will stay taut.

When all the fabric covering is in place and has been shrunk

APPLY A STITS LITE FINISH

tight, seal it with a coat of Poly Brush fabric primer. It's the equivalent of a clear dope coat, and it seals the fabric so that it's ready for subsequent color coats. Poly Brush does not, however, help to shrink the cloth.

■ **Fuselage.** I modified my Fly Baby to include the classic fabric fairing between the vertical tail and the fuselage turtle deck. Using Stits fabric, what you might have thought impossible is actually easy. Begin by covering the horizontal stabilizers (if they're permanently attached to the fuselage), and then cut a piece of fabric that's large enough to cover the entire fuselage side from the tail to the firewall. Extend it above the top stringer and below the bottom longeron. The fuselage bottom will be covered with a separate piece; you may do this before or after you've covered the sides and top. Cut a slit in the cloth for the horizontal tail to slip through, and start to attach the fabric to the fuselage there. Next, glue the fabric down all along the vertical fin's trailing edge (TE), and then along the lower longeron, all the way to the nose, pulling the fabric as taut as you can. Now attach



The side of the fuselage and the vertical fin have been covered. Cover the other side of the fuselage before you shrink the fabric. Tighten both sides evenly; if you tighten one side before you've covered the other side, you risk warping the structure.



To form the classic fabric fairing shape at the base of the fin, cover it and the fuselage with a large piece of fabric. Here, I am gluing the fabric down at the base of the fin where the fairing starts.



The fuselage and fin have been completely covered, and the fabric is ready to be tightened. Note the small wrinkles at the base of the fin; they will all be removed with heat from a covering iron.

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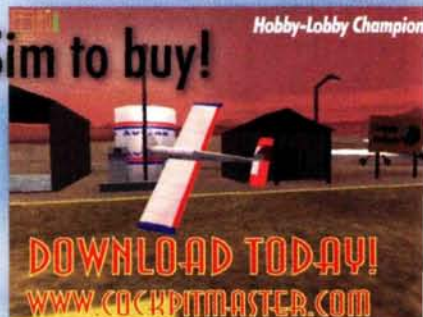
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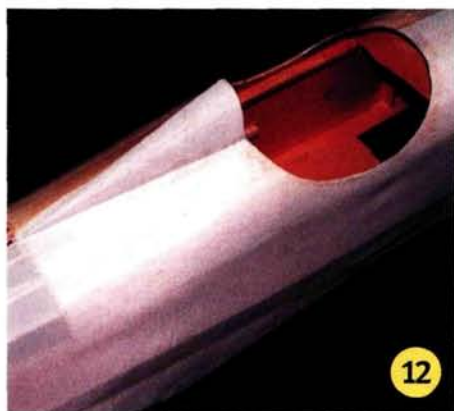
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the fabric to the curved part of the dorsal fairing, and work along the fin's leading edge (LE) and forward along the top stringer. Wrap the top edge around the top stringer and use extra Poly Tak to secure the fabric; this forms the base for the fabric you'll attach to the other side. The secret here is that you must pull and stretch the fabric as you go to make it conform to the curve you want. This takes patience and some practice, but the result is worth it.

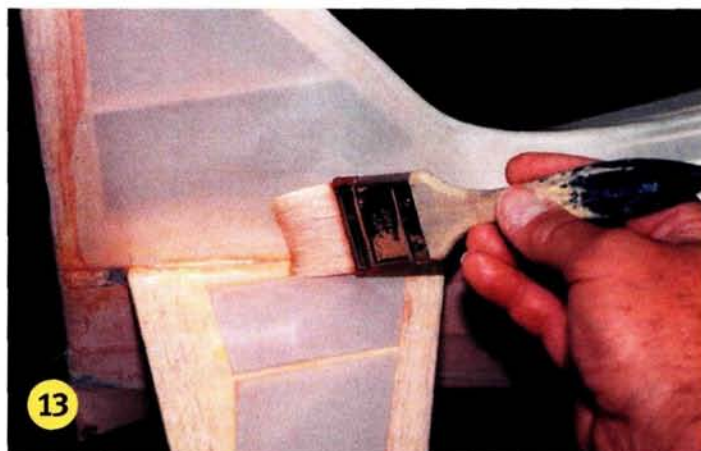
Cover the fuselage's second side using the same procedure as you used for the first. It makes no difference which side you cover first, but do not shrink one side tight before you've covered both sides, or you might distort the fuselage beyond repair.



Here's the front of the fuselage with the first side covered. To make the job easier, I covered the headrest separately.

Like the control surfaces, the fuselage is finished with a coat of Poly Brush to seal the fabric.

To finish the front of the fuselage, pull the remaining edges of the big fabric pieces tight and glue them into place. Cover small items such as the pilot's headrest separately with small pieces of fabric. When you've finished the shrink-



ing and edge sealing, the fabric will assume that beautiful, classic fabric fairing contour and will then be ready for a coat of Poly Brush.

That's about it for applying the cloth; now brush on the first and second coats of Poly Brush, and if you want a really smooth finish, spray on a third coat using a touch-up gun.

Next time, I'll show you how to apply all those great surface details—rib stitching and pinked tapes—that make any model come alive. Also, I'll tell you how I prepare a fabric surface for painting using Poly Tone paint. ✚

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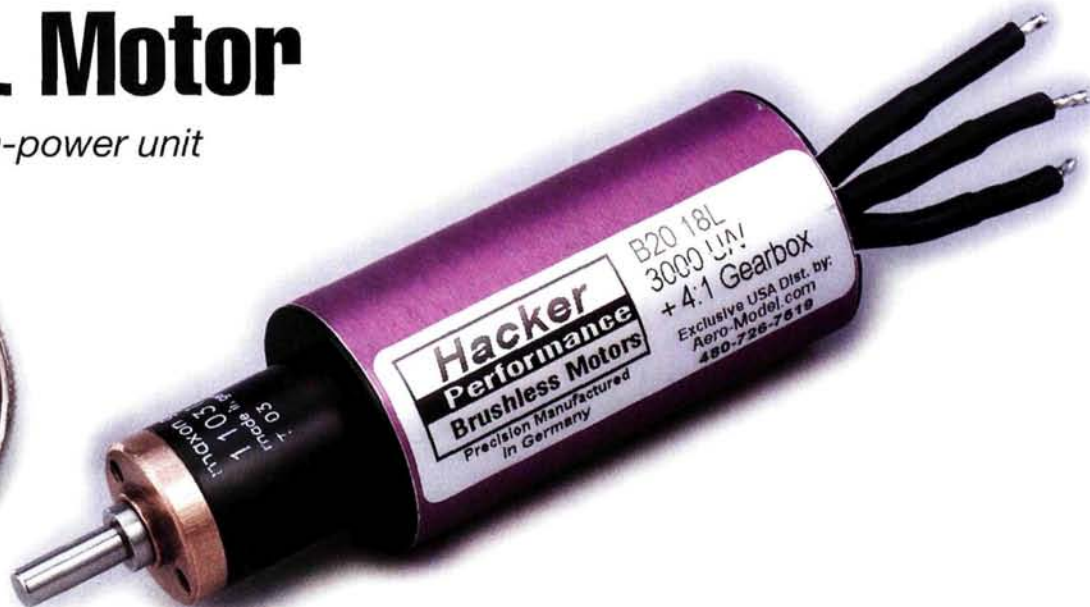
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Hacker Brushless B20 18L Motor

A high-quality, high-power unit

by Bob Wilder



Have you been using standard DC motors but are now considering purchasing your first brushless motor? In that case, you may wonder just what the difference is between the two. Obviously, on a brushless motor, there are no worn brushes to replace. It is also more efficient because there is no drag or power loss at the brush/commutator surface, and brushless motors cool off more efficiently because their windings are in direct thermal contact with the outside of the motor case.

The brushless B20 18L motor from Hacker, distributed in the U.S. by Sean Plummer of Aero-Model Inc., is one in a series of light-weight, RC-designed German motors that is intended for slow and park flyers and even for Speed 400 pylon racers. The B20 18L is particularly suitable to replace a direct-drive Speed 400 motor in a small electric pylon racer. The Hacker unit with its 4:1 precision planetary gearbox weighs 70 grams. The

Hacker gearbox is Swiss-made from Maxon.

The relatively small B20 18L motor produces a lot of thrust for its size. It is also capable of operating at a much higher wattage than some larger motors. If it is completely cowled in, use vents to dissipate all the heat that it generates. Because the Hacker motor is so small, you can also mount it in a smaller, more streamlined model, if you wish.

The gearbox is attached to the front end of the Hacker B20 18L with mating threads. The front end of the gearbox has two threaded holes, so you can mount the assembly from a standard bulkhead arrangement. To attach the motor more securely, place a clamp around the motor case.

You may also ask whether your old standard speed control will work with a brushless motor; it won't. Just as the standard DC motor controllers have many different options, so do brushless controllers. For this test, I used a Jeti 18-3P that has a brake (which you can de-activate) and built-in overload protection. Like many controllers, it will turn the motor off if the voltage drops below 5.3. When you select a controller for your motor, above all, be sure it will handle the maximum amp load that

SPECIFICATIONS

Name: B20 18L

Manufacturer: Hacker

Distributor: Aero-Model Inc.

Type: brushless motor

Weight: 56.7g (motor), 11.34g (4:1 gearbox)

Dimensions: 20cm diameter, 68.85cm long

Cells: 6 to 10

Current: 4 to 12 amps

Prop sizes: 10x6 to 11x6 (slow type)

Price: \$135

Comments: the B20 18L is a high-quality, well-made motor that delivers a lot of thrust for its size.

TEST DATA

Hacker B20 18L geared 4:1

HACKER B20 18L with 9x7 GWS prop

Volts	Amps	Watts	Thrust (oz.)
6	5.6	33.6	8.6
7	7.2	50.4	11.4
8	8.8	70.4	14.2
9	10.4	93.6	16.9

HACKER B20 18L with 10x8 GWS prop

Volts	Amps	Watts	Thrust (oz.)
6	8.5	51.0	10.5
7	10.7	74.9	13.8
8	13.1	104.8	17.1
9	15.7	141.3	20.1

you expect to draw.

When you use the Hacker B20 18L motor and Jeti 18-3P controller combination, you can consider many types of airplane designs, including the Northeast Sailplane Products Pleaser 400 and Virus 400 with ailerons, and the Great Planes Mini Laser 3D and Fundango. The Hacker B20 18L is a lot of power in a little package. ✈

Aero-Model Inc., 2122 W. 5th Place, Tempe, AZ 85281; (480) 726-7519; fax (480) 963-5565; www.aero-model.com.

GWS; distributed by Balsa Products, 122 Janson Ave., Iselin, NJ 08830-2601; (732) 634-6131; www.balsaprop.com.

Jeti, distributed by Hobby Lobby Intl., 5614 Franklin Pike Cir., Brentwood, TN 37027; (615) 373-1444, fax (615) 377-6948; www.hobby-lobby.com.



Hobby Lobby Hawker Hurricane

I'm glad I couldn't see into the future of RC when I was a young, model-airplane loving kid because if I had known then that mini, fly-at-your-local-ball field, WW II fighters were to come, I would have had myself cryogenically frozen with instructions to wake me when it all started happening. Well, it has all started to happen, and my years in this world notwithstanding, I'm still a kid! Dogfighting at your local schoolyard with a couple of prefinished mini warbirds—that can not only be built in a day but also fly well—is now a reality. Who would have believed it? Not me, even just a year or two ago. But the future is here, and Hobby Lobby's pretty little Hawker Hurricane is just the beginning.

HURRICANE'S PERFORMANCE

Although the Hurricane's scale-like appearance is definitely one of its most distinctive attributes, its flight performance is truly the standout feature here. This cute little fighter can dogfight its way within the confines of a professional baseball diamond infield. Surprisingly, even with its fantastic slow-flight characteristics, it can handle mild to moderate breezes adeptly—in the hands of an experienced pilot, of course.

With its light wing loading, high-lift airfoil and 4.5:1 ratio driven 9x6 prop, the Hurricane gets off from a taxi run in about 15 feet and climbs skyward with authority. In the world of electrics, the Hurricane has very good climb performance when equipped with the optional Speed 300 motor. Does it climb like aerobatic sailplanes? No, but they're powered by very expensive motors. With the optional Speed 300, the



Hurricane gets to a safe altitude in very short order, and the Speed 300 costs only about \$15.

The Hurricane's full-throttle demeanor was very relaxing. It never displayed any tendency to balloon coming out of a high-speed turn—an annoying habit that many airplanes with an under-cambered airfoil often have, but not this one. Because of the Hurricane's considerable dihedral, with proper rudder throw, it can be yanked into a tight, fighter-style turn with no problem and no tendency to tip-stall whatsoever.

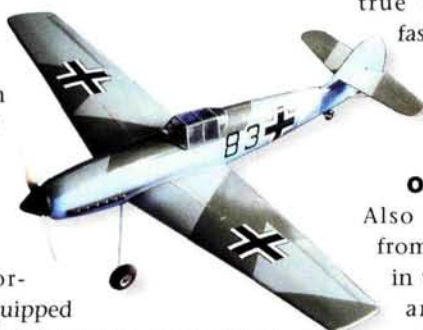
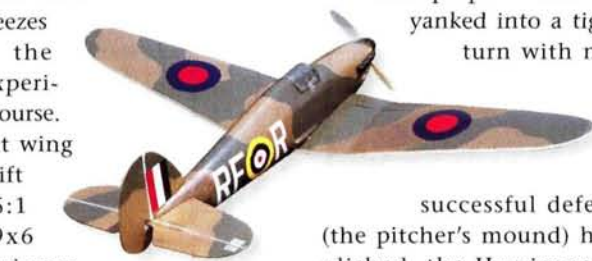
And after the successful defense of London (the pitcher's mound) has been accomplished, the Hurricane returns to the airfield (third-base line) in true backyard-flyer fashion—that is, at a very stable crawl.

A WORTHY OPPONENT

Also available now from Hobby Lobby, in the same format and size as the Hurricane, is its historic nemesis: the Me-109. Both kits are constructed of fairly

resilient foam that has a semi-gloss camouflage finish, over which water-slide decals are applied. The modeler must install some internal balsa and plywood structures, but all procedures are fairly simple and easy, even for relative newcomers—all procedures, that is, except the spinner assembly, which isn't all that difficult (it just seems more complicated than it needs to be). The problem is that the thin plastic is hard to cut without its flexing. If you aren't careful, you will end up with a wobbly spinner. With today's materials and technology, there must be a better and simpler way.

A word about adhesives: since a lot of these new park flyer/backyard flyer models are constructed of various types of foam, some being quite resilient, I think it's worth reminding everyone not to use



As you can see, the parts count for the Hurricane is very low (20 or so), and Hobby Lobby's estimated building time of 5 to 6 hours is not at all unrealistic.

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BACKYARD FLYER

SPECIFICATIONS

Model: Hawker Hurricane

Manufacturer: Scorpio Models

Distributor: Hobby Lobby Intl.

Type: semi-scale

Smallest flying area: baseball infield

Building—minimum skill level: intermediate

Flying—minimum skill level: intermediate

Wingspan: 40 in.

Wing area: 240 sq. in.

Length: 37 in.

Weight: 18 oz.

Wing loading: 10.78 oz./sq. ft.

No. of channels: 3

Drive system used: Speed 300 w/MJ gearbox (4.5:1)

Radio system used: JR Quattro Lite

Battery used: 7-cell, 600AE Ni-Cd

Flight duration: 5 to 6 min.

Price: \$89

Features: pre-painted foam structure with internal wooden structure; high-lift under-camber airfoil, model supplied with MJ gearbox (4.5:1 ratio) and APC prop adapter.

Comments: more than any other currently available park/backyard flyer, the Hawker is representative of things to come: that is, great-looking models with tremendous scale appeal that can not only be built in a very short time, but that can also be flown in small areas close to home.

CA-type glues on any joint that comes into contact with the foam. These glues aggressively attack foam and will melt it. While specially formulated CA is available for foam, I still find 5-minute epoxy is the way to go. But a word of caution here, too: denatured alcohol is the cleanup solvent to use with epoxy; unfortunately, it will also instantly clean up—or clean off—the Hurricane's beautiful camo finish, so be careful.

The Hurricane is a sheer pleasure to fly, and you can have it built in a day on your kitchen table. Get a Hurricane, and you'll be defending the local ball field by doing full-bore attack runs on that invading Me-109 your buddy purchased from Hobby Lobby. I'll tell ya what: radio control airplane modeling certainly has changed since I was a kid. Luckily, it doesn't matter. Today, as an old kid, I'm still having just as much fun. If this little WW II fighter turns you on, check out our new publication, *Backyard Flyer*; it's dedicated to small, fly-at-home airplanes and the equipment related to them. ✦

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PRODUCT WATCH

Latest product releases

AT MODEL AIRPLANE NEWS, we not only tell you what's new, but we also try it out first to bring you mini-reviews of the stuff we like best. We're constantly being sent the latest support equipment manufacturers have to offer. If we think a product is good—something special that will make your modeling experiences a little easier or just plain more fun—we'll let you know here. From retracts and hinges to glow starters and videotapes, look for it in "Product Watch."

GREAT PLANES MODEL DISTRIBUTORS CO.

RealFlight Add-Ons, Volume Three Expand your virtual hangar

Flight simulators are a great way to learn maneuvers or just to sharpen your skills, and I think that Great Planes *RealFlight* RC flight sim is one of the best. *RealFlight* has a variety of aircraft—from gliders to giant scale and helicopters—and virtual flying fields. After the success of Add-Ons, Volumes One and Two, Great Planes now brings us Add-Ons, Volume Three, with 13 new airplanes, five new 3D flying fields and Thunder Tiger's Raptor 30 and 60 helicopters.

One nice feature of a flight sim is the ability to fly an assortment of aircraft. Warbirds are always a favorite of mine, and Add-On Three comes through with the much requested P-38 Lightning and P-47D Thunderbolt. You jet guys haven't been left out; for excitement, try the A-10 Warthog—one of the heroes of Desert Storm. If you aren't into heavy metal, why not go with the easy flying Spirit Elite sailplane or the SlowPoke Sport 40. Giant scale is well represented with the RAF Chipmunk and the Stinson Reliant SR-9.

The five new flying sites are pretty cool; my favorite is the Coastal Lighthouse. I had a lot of fun cruising up and down the coastline in the Chipmunk. For you indoor and micro flyers, the Gymnasium will make you feel right at home. Claustrophobic? The wide-open space of the Illinois Farm is just what the doctor ordered. All five fields feature *RealFlight*'s PhotoField graphics and editable terrain and are compatible with previous versions of *RealFlight* software. *RealFlight* Add-Ons, Volume Three costs \$29.99. —Rick Bell



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—Rick Bell

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PRODUCT WATCH

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or without prescription glasses or contacts. The MagEyes Plus comes with two acrylic lenses: 1.6X and 2X. A 5X loupe is included and can be used on either side of the headband. Four magnification lenses can be bought separately or in different packages with the headbands, depending on the type of work you do.

So, what did I see through the MagEyes? A wide field of distortion-free vision. I easily adjusted the angle of the lenses to focus on my work. For more magnification, I simply changed the lens: just slide it out and replace it with the higher power lens. At \$34.95, the MagEyes Plus is a must-have for anyone performing close-up, intricate work. —Kevin Hetmanski

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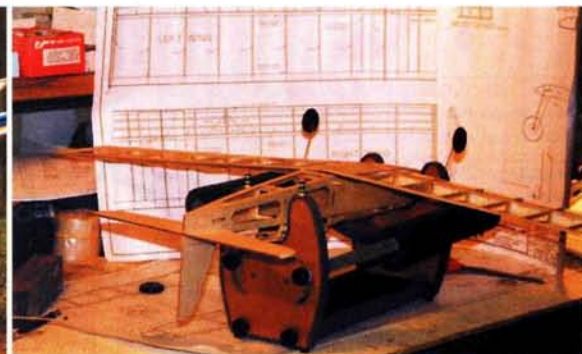


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The Super-Stand is one of the best workshop and field accessories I've seen in quite a while, with several features that separate it from other model stands. The Super-Stand is manufactured from top-quality plywood and hardware; all exposed edges are padded to protect your models. A two-part, 30-inch pole is included on which to mount the stand; no assembly tools are needed. The two fuselage cradles are padded with felt. The two adjustable side supports brace your model by stabilizing the wings and are padded with thick foam pipe insulation. They do a great job of preventing your model from tipping in the stand.

In the shop, the Super-Stand is helpful when you install hardware or program your radio. Four small rubber feet provide a non-slip grip for the stand, and a felt-lined center tray holds small screws, nuts and bolts; a camera tripod can be mounted on the stand. You can also use the Super-Stand to check your plane's center of gravity (CG). Each cradle has a pair of holes to accept two short sections of pencil ends (included) on which you place the plane.



The 30-inch support pole has an 8-inch spike that anchors it and elevates the stand. A swiveling pivot on top of the pole allows your model to "weathervane" into the wind. I use my stand for smaller gas-powered models, sailplanes, 2-meter and larger sport gliders with good results. At \$75, I consider the Super-Stand a super buy.

—Thayer Syme



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Congratulations to David Jones of Evanston, IL, for correctly identifying November's mystery plane as the Savoia-Marchetti S.M.83. Used by Italian, Belgian and Rumanian airlines, this 10-passenger commercial transport plane was initially powered by three 750hp Alfa Romeo 126 RC.34 radial engines that could reach a maximum speed of 371mph and a cruising speed of around 224mph. First flown in 1938, the S.M.83 was equipped with Handley-Page slots and flaps and had luggage compartments beneath the fuselage. All together, Savoia-Marchetti produced 23 S.M.83s. If you looked closely enough at the photo, this one was easy: the manufacturer and model names are clearly printed on the aircraft's nose.



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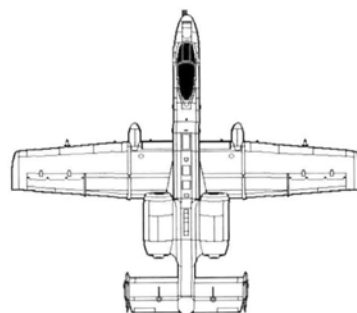
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Look, Ma—no thumbs!

Every year, improved technology fuels the growth of the RC industry and ensures greater opportunities for experimentation and innovation. Advances in design, radio equipment, and engine and motor capabilities inspire RC enthusiasts to push the limits of accepted practices. Now, technology is going as far as to eliminate one of the fundamentals of RC flying—the pilot.

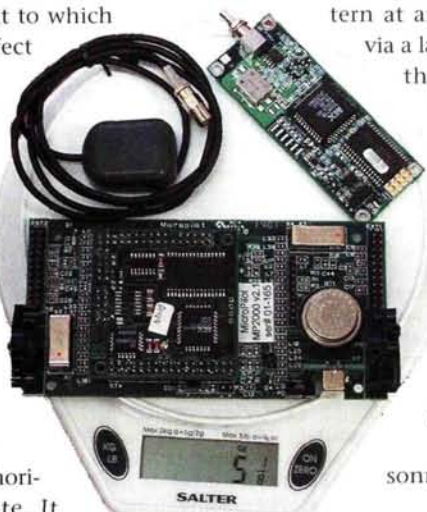
The MP2000 is a miniature autopilot system from MicroPilot that, under certain conditions, renders the term “radio control” virtually obsolete. As frightening as it is for RC enthusiasts to imagine being stripped of their trusty transmitters, computer-controlled models represent an emerging technology and are a good indication of the extent to which modern engineering continues to affect our hobby.

The MP2000 weighs less than 6 ounces, is small enough to fit into a .40-size RC trainer and is capable of stabilizing and guiding highly functional, autonomous unmanned aerial vehicles (UAVs) or remote piloted vehicles (RPVs). The computer-programmable unit has a built-in microprocessor and sensors that are capable of airspeed and altitude hold, global positioning system (GPS) navigation, autonomous takeoff and landing, and turn coordination with an authoritative 20-degree-per-second turn rate. It includes all of the sensors required for complete airframe stabilization and can support flaps, separate flaperons, combined flaperons, elevons, V-tail and split rudders. It also has a low-battery warning that will automatically activate both on the ground and in the air.

Though flight patterns are completely programmable, the folks at MicroPilot are also conscious of the importance and prestige RC pilots place on their ability to control their models, and the MP2000 reflects that awareness. The autopilot feature can be activated or disabled at the pilot's own discretion. That means that you decide just how much or how



Left: Georgia Tech's fixed-wing model with the MP2000 installed. Below: the MP2000 is both compact and lightweight. Though it's a bit tight, the MP2000 is small enough to fit into a .40-size trainer, as seen here.



The MP2000 weighs in at approximately 5 ounces, but it tops out at around 6 ounces with connectors.

little control you want the MP2000 to have. If radio modems are installed, the pilot can manually override the system or change the waypoints on the flight pattern at any point in flight

via a laptop computer on the ground. A nice

feature of the MP2000 is that it will automatically switch to autonomous flight upon the loss of an RC signal.

MicroPilot has been designing miniature autopilots using low-cost (GPS) receivers and rate sensors since 1995. Over the years, MicroPilot autopilots have flown a wide range of UAVs, from 2-pound micro aerial vehicles (MAVs) to high-speed, turbine-powered drones.

Academic and private research institutions, military personnel and UAV manufacturers worldwide use MicroPilot autopilots for a wide variety of purposes. The MP2000's extensive data logging and telemetry capabilities enable it to perform aerial surveillance, collect weather data and detect chemical weapons, but the autopilot's

range depends on the type of aircraft in which it's installed.

Last July, MicroPilot garnered considerable recognition at the 2001 International Aerial Robotics Competition (IARC) in Maryland. The IARC is an international collegiate competition that challenges participants to design computerized aircraft capable of accomplishing a predefined mission without any outside operator assistance.

The team from the Georgia Institute of Technology took the lead in the ongoing competition using the MP2000 in a fixed-wing UAV. The mission involved flying 3 kilometers to the site of a simulated nuclear reactor meltdown, finding and entering a building through an open window and transmitting back images from inside the structure.

MicroPilot autopilot systems vary in price from \$1,800 for the simplest versions to \$5,000 for top-end products such as the MP2000. For more information, visit the MicroPilot website at www.micropilot.com. ✦



This team from the Georgia Institute of Technology took the lead in the 2001 International Aerial Robotics Competition using the MP2000.